

Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: University of Latvia

Study field: Chemistry, Chemistry Technologies, and Biotechnology

Experts:

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

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The aims of the Study field "Chemistry, Chemistry Technologies, and Biotechnology" are clearly defined and achievable. The connection between the study programmes of the Study field is clear, logical and basically the only possible one. The SWOT analysis and Development Plan has been developed by the staff and students of FC, taking into account the initiatives of employers. According to the experts, the Development Plan should be carefully revised; educational opportunities for adults and lifelong learning, the implementation of balanced research and pedagogical activities should be included in accordance with the guidelines of the National Education Development Guidelines 2021-2027 "Future Skills for the Future Society". All stakeholders, the head of the study field, the dean, the study programme director, academic staff, students, administrative staff, alumni and employers are dedicated at the highest possible standards to the development of Study field and programmes. Student admission procedures and requirements for admission of students, procedures for recognition of study time, work experience, formal and non-formal prior learning, and assessment of student performance and learning outcomes are developed and publicly available to all stakeholders. Assessment criteria and methods for all planned learning outcomes in the form of knowledge, skills, and competencies are available to students. Student survey results, academic staff experience in conjunction with peer collaboration, analysis of student performance, and changes to learning outcomes and justification criteria are methods for adjusting the assessment system based on programme goals and student needs. All documents governing the area of academic integrity and the mechanisms for complying with them are publicly available to UL staff and all students. Both study programs are recognised by international accreditation - "Chemistry Eurobachelor" (BSPC) and "Chemistry Euromaster" (MSPC). Unfortunately, a high dropout rate is characteristic of both the Bachelor's and Master's programmes. According to the experts, UL has established a working and sustainable quality policy that is publicly available. Quality assurance system is well described, has been developed based on best practises, and contributes to the achievement of the aims and learning outcomes of the Study field and related programmes of study. In experts opinion, the data obtained from the system analysis ensures the development and improvement of the Study Field and the study programmes. All information about Study field and study programmes is publicly available on the UL website. The review process for the Study field and study programmes, as well as the feedback mechanisms, are understandable to all stakeholders.

According to the experts, UL and FC have a good endowment of resources: well-qualified teaching staff, a fully purchased equipment park, the devices and equipment are fully available for research work and for teaching students, lecture rooms are fully equipped, the library with large open spaces is available to staff and students 24/7. The Moodle platform is successfully used to facilitate the teaching process. In experts opinion, UL provides comprehensive support (psychological and financial) to its students during their studies, and the study programmes are focused on student-centred learning.

The directions of scientific research of the Study Field correspond to the development goals of the UL and are relevant for the Study field and industry. Scientific research and the outcomes thereof are integrated in the study process in both evaluated study programmes. UL has developed well-functioning and efficient mechanisms to promote the involvement of the students in scientific research. The directions of the scientific research of the Study field are consistent with the development goals of the UL and relevant to the Study field and industry. Scientific research and its results are integrated into the study process in both evaluated study programmes. According to the experts, UL has developed well-functioning and efficient mechanisms to encourage student participation in scientific research.

Cooperation with local and foreign institutions is concluded in both directions. Already in the first years of study, students are involved in research or find employment in local companies. Exchange students are mainly interested in research work. The incoming and outgoing mobility of students and academic staff is not sufficient.

The recommendations (Joint report of experts (2011) and Recommendation to the Master's study programme " Chemistry" (45441) - year 2021) have been analysed by the staff of FC and most of the recommendations have been implemented in the bachelor's and master's study programmes.

According to the experts, the bachelor study programme is characterized by highly qualified and motivated teaching staff, the involvement of several professors and other academic staff in the delivery of most individual courses, the low student-to-faculty teacher ratio that ensures full commitment of the teaching staff to students, which facilitates the organization of the study environment and the application of the student-centered learning approach. Coordination with employers in revising the study program and updating courses is a common way for the development of the study program.

The major drawbacks of the study program are the high dropout rate and insufficient participation of visiting professors and researchers in the implementation of the study programme. In addition, e-repository of the thesis is not publicly available, making it impossible to access one of the fundamental outcomes of higher education at a public institution. There is a lack of analysis of the combined student workload (especially in the first year of study). Tuition fees should be set appropriately based on an accurate analysis and taking into account the increase in the number of enrolled students.

Just like the bachelor study program, the Master's program is characterized by highly qualified and motivated teaching staff whose research activities fully cover the areas of the study programme. The low student-to-teacher ratio ensures full faculty engagement with students, which facilitates the organization of the study environment and the application of the student-centered learning approach. The high level of student involvement in scientific research activities is reflected in numerous scientific publications where students are co-authors or even first authors. Coordination with employers in revising and updating the program of study results in a high demand for graduates in the labor market.

According to the experts, the high dropout rate and insufficient participation of visiting professors and researchers in the implementation of the study programme are the main drawbacks. The teaching load of some professors, the lack of analysis of the combined student workload, the questionable calculation of tuition fees, and enrollment criteria are other important challenges that need to be addressed.

In experts opinion, the FC has a sufficient number of teachers who are excellent and internationally recognized scientists, fluent in English and not burdened by teaching in Latvian, the excellent equipment of teaching rooms and (student) laboratories, and the cooperation with other scientific institutions and the business community are sufficient conditions for the implementation of the English-language Master's program.

I - Assessment of the Study Field

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1.1 Management of the Study Field

Analysis

1.1.1.

The aims of the study field "Chemistry, Chemistry Technologies, and Biotechnology" (Study Field) (SAR, Part 2, 2.1.1., p. 16) are as a rule clearly defined and attainable. The only exception relates to the statement "The aim of the study field ... to provide students with the opportunity to acquire knowledge, practical skills and participate in innovative, internationally competitive research and production," where it is not clear what the word "production" refers to, i.e., this part of the statement is incomplete.

Objectives and tasks of the Study Field are clearly stated in the Development plan for the study field "Chemistry, chemical technology and biotechnology" 2021-2027 (Annex 3 of the SAR). The Study Field and the relevant study programmes, Bachelor Study programme Chemistry (BSPC) and Master Study programme Chemistry (MSPC) comply with the Development strategy of UL (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/1._VISPAREJIE_DOKUMENTI/LU_strategija_buklets_2021.pdf), National Education Development Guidelines 2021-2027, national economic development trends, labor market needs of the chemical and pharmaceutical production companies as well as of relevant industrial sectors, and research institutions such as Latvian Institute of Organic Synthesis, the Institute of Food Chemistry, and the BIOR Institute (SAR, Part 2, Chapter 2.1.1., p. 16).

Interconnection of the study program included in the Study Field is logical, but it should be pointed out that it is also the only one possible since only two study programs are included in the Study Field, one at the bachelor level and the other at the master level. The completeness of the Study Field lacks a corresponding doctoral study program, but also other study programs that belong to other disciplines covered by the subject study field. Further development of study programs, for example joint study programs in the field of chemical technology/engineering and biotechnology, would give potential candidates for admission to the Faculty of Chemistry (FC) a wider spectrum of study opportunities, and consequently also in finding a job and, globally, in the recognition of the FC and Study Field on a national and international level.

It is particularly noteworthy that both study programs follow the guidelines developed by the European Chemistry Thematic Network (ECTN) for the development of chemistry study programs and have been awarded the quality labels "Chemistry Eurobachelor" (BSPC) and "Chemistry Euromaster" (MSPC) in 2017 and 2021, respectively, giving both study programs recognized international accreditation (SAR, Part 2, Chapter 2.1.1., p. 16).

The National Education Development Guidelines 2021-2027 "Future Skills for the Future Society" (Cabinet Order No. 436 of 22.08.2021.) provide educational opportunities for adults and life-long education as the important directions of the development for the educational institutions. These directions of the development are not mentioned in the aims of the Study Field (SAR, Part 2, Chapter 2.1.1., p.16). According to the experts, it would be recommendable to integrate this aspect in the goals in the development plan of the study field.

1.1.2.

The SWOT analysis (SAR, Part 2, Chapter 2.1.2., pp. 17-20) and Development plan for the study field "Chemistry, chemical technology and biotechnology" 2021-2027 (Development Plan) (Annex 3 of the SAR) has been developed by the staff and students of the FC taking into consideration initiatives of the employers. The working group involved in the development of the SWOT analysis was composed of FC lecturers, representatives of graduates and employers, FC administration representative and FC students representatives. The SWOT analysis was approved by the Study Field Council and the Council of the FC.

Although strengths, weaknesses, opportunities and threats were carefully analyzed, all involved in the development and approval of the SWOT analysis failed to recognize the lack of life-long learning programs as a weakness. According to the experts, it is necessary to include the lack of life-long learning programs in the SWOT analysis. Correspondingly, goals connected with the development of life-long learning programs on different subjects are important for Study Field as well as

corresponding indicators should be included in the Development Plan.

Additionally, measures connected with decreasing the drop-out rate should be further developed, especially those for BSCP (SAR, BSPC Annexes, Statistics on the students in the reporting period,). For example, zeroth semester in mathematics, or workshops on some specific topics of mathematics, physics, biology and chemistry could be developed and used to increase students' level of knowledge needed for normal participation in the teaching process and fulfillment of learning outcomes of the courses of the study programs, especially for those in the first year of the study. Also, reasons for drop-out at MSPC should be continuously analyzed and appropriate measures should be taken in a timely manner in case the drop-out rate continues to be as high as it was in the academic year 2021/2022 (SAR, MSPC Annexes, Statistics on the students in the reporting period).

The demographic situation in the country was included in the SWOT analysis (SAR, Part 2, Chapter 2.1.2., p. 19) and some improvements of the study process as well as a support system for the first-year students are included in the Development Plan (SAR, Annexes, Plan for the development of the study field). The combination of the lower number of school leavers and high drop-out rates may affect the sustainability of the BSPC and MSPC study programs.

The National Education Development Guidelines 2021-2027 "Future Skills for the Future Society" (Cabinet Order No. 436 of 22.08.2021.) require the implementation of balanced research and pedagogical activities. The Development Plan (SAR, Annexes, Plan for the development of the study field) contains no information about this goal in the corresponding section (Section 4, Excellence-oriented personnel policy).

According to the experts, all other existing measures and activities foreseen in the Development Plan are properly formulated and in the service of achievement of the strategic goals of the FC and consequently of the UL.

1.1.3.

The management of the Study Field and programs, as well as all activities aimed at the management of all areas of activity of UL and FC are effective and clearly defined (SAR, Part 2, Chapter 2.1.3., pp. 20-24). Bodies directly involved in the administration of the study programs and the Study Field are the Senate, the UL Study Program Quality Assessment Commission, the FC Council, and the BSPC and MSPC Councils. The responsibility of the UL management for the quality is delegated to the academic departments. Therefore, responsibility for program quality is directed to the head of the study field, dean, and study programme director.

In addition to the management of UL and FC, it should be noted that academic staff are responsible for the quality of content and delivery of courses, research activities, and professional development. At the same time, it is important not to forget the role of students, which is clearly highlighted by their rights and responsibilities in promoting UL's goals and excellence, as well as by their participation in the work of UL's governing bodies and their expression of opinions in various surveys conducted at UL (SAR, Part 2, Chapter 2.1.3., p. 20).

According to the experts, all procedures about management, quality assurance and development of the study fields at UL, the function and operating principles of the study field council, qualification requirements, duties, responsibilities and rights of the head of the study field and directors of study programs are clearly described in Regulations on the University of Latvia Study Field Management (Regulations)

(https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/3._STUDIJU_UN_ZINATNES_PROCESU_REGLAMENTEJOSIE_DOKUMENTI/Nolikums_par_LU_studiju_virzienu_parvaldibu.doc_OK_EN.pdf). The Regulations apply to all study fields implemented by the UL, the study programmes included and developed therein, as well as to the opening and closing of study fields. Based on the Regulations and interviews conducted with the dean of the FC, members of the group responsible for the preparation of SAR and quality assurance system related issues, the head of the

Study Field and both study programme directors, it is clear that management of the FC is oriented towards the development of the Study Field, while in the same time decision making procedures are clear, effective and based on deep analysis of all issues related to the Study Field, study programmes and all involved in the education, research and professional development at FC.

Several UL administration units are involved in the support of the Study Field and corresponding study programs. The most important are the Academic Department, the Department of Study Quality Assurance and the Department of Study Services. The role and responsibility of these bodies is described in detail in the SAR (SAR, Part 2, Chapter 2.1.3., pp. 23-24). In addition to these bodies, the head of UL Quality Control and Internal Auditor also play a significant role in the development of the quality policy of Study Field and study programs (SAR, Part 2, Chapter 2.1.3., p. 24). The Department of Academic Competence Development of the University of Latvia and its role in the development and improvement of the professional career of academic staff as well as the general professional development of all UL employees should definitely be added here as one of the important UL institutions for development of Study Field and study programmes (SAR, Part 2, Chapter 2.1.3., p. 24).

The support provided by technical staff in relation to the needs of the study programs of the corresponding study field is not analyzed at SAR.

Finally, but not least, the role of students and student representatives should be emphasized, who have the opportunity to influence all UL decisions through the UL Student Council. Likewise, the student representatives of FC in the various committees of FC have the opportunity to participate in solving various issues related to the academic, social and cultural environment, thus playing an active role in the development of Study Field and FC study programs (SAR, Part 2, Chapter 2.1.3., p. 24).

1.1.4.

Student admission procedures and requirements as well as and normative regulations governing recognition procedures are developed and publicly available on the web pages of UL and FC (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/3/26_Enrolment_rules_at_the_UL.pdf). According to the experts, the only drawback concerns the Terms of Admission and Criteria for Postgraduate Studies, which are available only in Latvian. This document must be translated into English prior to the start of applications to MSPC so that potential applicants who are not residents of Latvia can be informed of all requirements related to the relevant admission procedures and requirements.

Enrolment in BSPC is centralized through the “Single Enrolment in Undergraduate Programmes” which integrates the enrolment in 12 universities in Latvia. Eligibility criteria for persons who have completed secondary education starting from 2004, as well as eligibility criteria for person who completed their secondary education before 2004 (not included), persons who completed their secondary education abroad or persons with special needs are developed and clearly described (SAR, Part 2, Chapter 2.1.4., p. 26).

Enrolment in MSPC is decentralized and based on grades obtained during undergraduate studies. It should be noted that the admission requirements for MSPC have been changed in accordance with the experts' recommendation from the previous evaluation and have been included in the amendments to the program back to 2021. In this regard, experts would like to point out that the admission requirements for Master's programs should be additionally reconsidered, as some programs important for the Study Field, such as the study of biotechnology and chemical engineering, are not considered as possible admission requirements for MSPC (SAR, Part 2, Chapter 2.1.4., pp. 26-27, and SAR, Part 3, General Information on MSPC, Admission Requirements, p. 105). Appropriate English proficiency level requirements have been provided for MSPC in English (SAR, Part 2, Chapter 2.1.4., p. 27).

Recognition of knowledge, skills and competences acquired through non-formal and extracurricular

education or work experience, as well as learning outcomes achieved in previous education, may be recognized on the basis of a number of documents adopted at UL level on this area, of which the following are highlighted: Procedure for Commencing Studies in Subsequent Study Stages at the University of Latvia, Regulations on UL Procedure for Recognition of Competencies Developed Outside Formal Education or Through Professional Experience and Learning Outcomes Achieved in Previous Education, and the UL Procedure for the Recognition of Study Courses and Knowledge, Skills and Competencies Acquired in Study Courses and Outside Formal Education or Through Professional Experience and Learning Outcomes Achieved in Previous Education (SAR, Part 2, Chapter 2.1.4., pp. 27-28).

In addition to these documents, for students who have studied or completed an internship within the framework of various international exchange programs, the recognition of learning outcomes and study achievements acquired in the framework of mobility is carried out according to the criteria of the Procedure for Organizing Erasmus+ Program Mobility at the UL. The support provided to students for the recognition of the acquired learning outcomes and courses of study includes direct assistance from the program director. In addition, students must agree on a plan for mobility courses and internships before starting the mobility (SAR, Part 2, Chapter 2.1.4., pp. 28-29).

According to the experts, information on admissions and recognition of learning outcomes and courses acquired through the various forms of formal and informal education is available to all stakeholders and the relevant procedures are prescribed and comprehensible.

1.1.5.

Assessment criteria and assessment methods for all planned learning outcomes in the form of knowledge, skills and competences are available to students in the UL Information System (LUIS) and UL e-learning environment (SAR, Part 2, Chapter 2.1.5., p. 29). Assessment criteria and assessment methods are part of the internal regulation Procedure for Development and Updating Study Courses at the University of Latvia (University of Latvia Senate Decision No 211 of 29.06.2015.), which is in accordance with the Law on Higher Education Institutions of the Republic of Latvia (<https://likumi.lv/ta/en/en/id/37967-law-on-higher-education-institutions>).

Students have the opportunity to receive information about assessment criteria and assessment methods during the first lecture when each lecture introduces students not just with requirements for intermediate assessments and final examinations and a description of grading criteria and examination procedures, but also with course organization, content, requirements and learning outcomes. It is important to point out that the evaluation and assessment criteria do not change during the semester (SAR, Part 2, Chapter 2.1.5., p. 30).

Semester examinations and the final examinations are two types of the assessment in each course. Written examinations are the dominant type of assessment in the courses of BSPC and MSCP, but where it is in accordance with the specifics of the course content, oral final exams are also conducted (SAR, Part 2, Chapter 2.1.5., p. 30). A detailed description of the evaluation procedure for each course is given for both study programs in the annex Descriptions of the study courses (SAR Mandatory Annexes for BSPC and MSCP).

There are several forms of interim assessment such as quizzes, individual work, practical work, laboratory work, reports, but also other acceptable forms of evaluation in accordance with the program of the study course. It is common for both study programs that students must have a positive evaluation of the interim assessment in order to take the final examination, because according to the requirements of the study program, this is the only way to achieve all the planned learning outcomes (SAR, Part 2, Chapter 2.1.5., p. 30). The overall grade of the course was calculated in the UL e-study environment based on the algorithm specified in the study course description (Descriptions of the study courses, SAR Mandatory Annexes for BSPC and MSCP).

Attendance at laboratory exercises and seminars is a mandatory prerequisite for students to access the evaluation for both study programs (SAR, Part 2, Chapter 2.1.5., p. 30).

For most subjects of both study programs, learning outcomes are evaluated on the 10-point scale. The 10-point scale is explained in Table 2.1.5.1 of SAR. Practically the only exception is the common UL study course "Civil protection", which is evaluated with "tested" or "not-tested" (SAR, Part 2, Chapter 2.1.5., p. 31).

In addition to the evaluation system of study courses, the basic criteria for the assessments and graduation examinations are also defined (Requirements for Elaboration of Defending of the Graduation Papers (bachelor's, master's, diploma, and qualification papers) at the University of Latvia, the UL Order NO 1/38 of 03.02.2012., https://www.lu.lv/fileadmin/user_upload/lu_portal/eng/general-information/documents/regulations/Requirements_for_elaboration_and_defending_of_graduation_papers.pdf). It should be noted that the evaluation of final papers in the Study Field takes into account the quality of the work, the author's report, the quality of the material presented, scientific novelty of results, and the relevance of the results to a scientific publication. In addition, the results of the final thesis (bachelor and master) can be previously published in the framework of a scientific paper or congress communication, which is also taken into account during the evaluation (Methodological rules for preparing, designing and evaluation of course papers and final papers) (SAR, Part 2, Chapter 2.1.5., p. 32)..

According to the experts, the needs of students are continuously analyzed whereby the results of the student survey are one of the types of adjusting the assessment methods and grading. Experience of the academic staff in combination with collaboration with colleagues, analysis of students achievements and changes of learning outcomes and justification criteria are additional methods for adjustments of the assessment system oriented towards achieving the aims of study programmes and the needs of students (SAR, Part 2, Chapter 2.1.5., p. 32).

1.1.6.

The principles of academic integrity and mechanism for their observance are stipulated in the Academic Ethics Codex of the University of Latvia (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/1/nr_2_3_46_akademiskas_etikas_kodekss_eng.pdf) and in the Regulations for Academic Integrity at the University of Latvia (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/1/nr_2_3_48_akademiskais_godigums_eng_1_.pdf). Both documents are publicly available (<https://www.lu.lv/en/studies/study-process/academic-integrity/>) to staff of the UL and all its students.

Academic integrity principles are carefully monitored in the study process for BSPC nad MSPC study programs, discussed in the course "Introduction to Studies and Research" and in the introductory lectures of all courses (Descriptions of the study courses, SAR Mandatory Annexes for BSPC and MSPC). In addition, the emphasis on academic integrity principles is given during the preparation of students' written reports, especially within the framework of the preparation of the final thesis (SAR, Part 2, Chapter 2.1.6., p. 33). Cases in which there was a violation of academic integrity, which refer to identical laboratory reports and related calculations, were recognized by a smaller number of students. Such behavior was discussed with the students involved, the reports were canceled and the students had to redo the practical laboratory work (SAR, Part 2, Chapter 2.1.6., p. 33).

At the UL level, a Unified Computerized Plagiarism Control System was developed, whose role is to verify student works such as qualification paper, diploma paper, bachelor's thesis, master's thesis, PhD thesis. The System is also available to other higher education institutions in Latvia, it is continuously developed and upgraded, and its main purpose is to automatically compare the graduation papers uploaded in the system of higher education institutions involved in the System, which includes first of all material available on the Internet. In the event that the System finds a predefined percentage of overlap with existing works, the programme director is automatically notified. Programme director discusses the above with the appointed supervisor, and in the event

that there is a justified suspicion of academic integrity breach, the Graduation Examination Commission is also notified, which issues a final decision on the specific issue (SAR, Part 2, Chapter 2.1.6., p. 33). At FC, there were no significant violations of academic integrity principles regarding the final thesis during the reporting period. One suspicion of self plagiarism for master's thesis was reject, and one case of fabricated results of the bachelor's thesis was found, which resulted in the final thesis being redone for the next academic year on a different topic (SAR, Part 2, Chapter 2.1.6., p. 34).

It is planned that from September 2023, at the UL level, the application of the Turnitin LLC anti-plagiarism tool will begin. Appropriate training, trial work and testing, and everything necessary for the full implementation of this anti-plagiarism software will be carried out beforehand (SAR, Part 2, Chapter 2.1.6., p. 34).

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

According to the experts, the aims of the study field are clearly defined and attainable with one exception for the term "innovative, internationally competitive production". The study field and the corresponding study programmes are in line with the main directions of the Development strategy of UL, the National Education Development Guidelines 2021-2027, the national economic development trends, the labor market needs of chemical and pharmaceutical manufacturing enterprises and relevant industries and research institutions. The connection between the study programmes of the study field is clear, logical and the only possible one.

The SWOT analysis (SAR, Part 2, Chapter 2.1.2., pp. 17-20) and Development Plan has been developed by the staff and students of the FC taking into consideration initiatives of the employers. The working group involved in the development of the SWOT analysis was composed of FC lecturers, representatives of graduates and employers, FC administration representative and FC students representatives. According to the National Education Development Guidelines 2021-2027 "Future Skills for the Future Society" (Cabinet Order No. 436 of 22.08.2021.), educational opportunities for adults and lifelong learning are the main development directions for educational institutions. These development directions are not mentioned in the aims of the Study Field and should be considered in the Development plan. The same is true for the implementation of balanced research and pedagogical activities called for in the National Education Development Guidelines 2021-2027 "Future Skills for the Future Society". The Development Plan should include information about this goal in the relevant section.

According to the experts, the management of the Study Field and programmes, as well as all activities aimed at managing all areas of activity of the UL and FC are effective and clearly defined. UL management responsibility for quality is directed to the head of the study field, the dean, and the study programme director. Academic staff are responsible for the quality of course content and delivery, research activities, and professional development. The role of students is clearly emphasised through their rights and responsibilities in promoting UL's goals and excellence, as well as through their participation in the work of UL's governing bodies and their expression of opinions in various surveys conducted at UL. Several units of UL administration are involved in supporting the Study Field and corresponding study programs, the most important of which are the Academic Department, the Department of Study Quality Assurance and the Department of Study Services.

Student admission procedures and requirements, procedures for recognition of the study period, professional experience, prior formal and non-formal education and for the assessment of students' achievements and learning outcomes are developed and publicly available on the web pages of UL and FC. Information on admissions and recognition of learning outcomes and courses acquired through the various forms of formal and informal education is available to all stakeholders and the relevant procedures are prescribed and comprehensible.

Assessment criteria and assessment methods for all planned learning outcomes in the form of

knowledge, skills and competences are available to students in the UL Information System (LUIS) and UL e-learning environment. Assessment criteria and assessment methods are part of the internal regulations. The results of the student survey, experience of the academic staff in combination with collaboration with colleagues, analysis of students achievements and changes of learning outcomes and justification criteria are applied methods for adjustments of the assessment system oriented towards achieving the aims of study programmes and the needs of students.

All documents governing the area of academic integrity and the mechanisms for complying with them are publicly available to UL staff and all students. UL has developed its own anti-plagiarism system (Unified Computerized Plagiarism Control System), which is available to other higher education institutions in Latvia. Starting in September 2023, UL will use the Turnitin software package, a commercial software to detect possible plagiarism in all forms of theses.

Strengths:

- 1) Both study programs are recognized through international accreditation - "Chemistry Eurobachelor" (BSPC) and "Chemistry Euromaster" (MSPC).
- 2) Efficient and effective anti-plagiarism tool developed - Unified Computerized Plagiarism Control System - available for other higher education institutions in Latvia.

Weaknesses:

- 1) Lack of educational opportunities for adults and life-long learning programmes on different subjects important for Study Field.
- 2) The implementation of balanced research and pedagogical activities should be considered in the Development plan.
- 3) High drop-out rate for both study programmes, BSPC and MSPC respectively.
- 4) The admission requirements for MSPC are not complete and should be reconsidered.

1.2. Efficiency of the Internal Quality Assurance System

Analysis

1.2.1.

The UL has established not only Quality policy (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/2/Kvalitates_politika_majas_lapai_ENG.pdf) but also Quality Action Policy (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/2/Kvalitates_ribspolitika_majas_lapai_ENG_new.pdf) that sets all necessary objectives and actions needed to maintain, assess and refine quality assurance system as whole. To promote development of quality culture in the UL Quality Management Handbook has also been developed (SAR, Other Annexes, Quality Management Handbook). Handbook very precisely describes tasks of all involved parties to ensure quality management, indicating the most important aspects (documents, procedures, structure) of the quality management system in UL. All these policies are developed and based on the European Foundation of Quality Management excellence model, which stipulates that quality management should be based on current sectoral standards and frameworks (SAR, Information on the Higher Education institution, Part 1, Chapter 1.3., pp. 9-12). SAR Chapter 1.3. page 11 describes how the study field development plan is being monitored and analyzed annually. Such approach allows to track development of study field plans ensuring the quality criteria. Such an approach contributes to the achievement of the aims of the study field. System is oriented on continuous development, for example, employers' opinions about improving study programme content are being taken into account (SAR, Part 2, Chapter 2.2.1., p. 35).

1.2.2.

Procedures for developing new study programmes are set in “Regulations on University of Latvia study and continuing education programmes” that are publicly available (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/3/Study_and_continuing_education_programmes.pdf). There is also a responsibility division in terms of approving and developing the new programme among governance bodies – programme directors, head of study field, study field council, faculty council, Senate etc. All of involved sides can review, suggest and propose changes in the study programme contents during the development process. For example Masters study programme in English language was created based on suggestions of staff members and employers, mentioned during the site interviews with study programme director and staff members. New study programme development and reviewing of already existing ones is based and described in Annual study field reports. Mentioned during the interviews by representative of Quality assurance system. (SAR, Part 2, Chapter 2.2.2., pp. 37-38). Regulations and guidelines for filling the annual report with a very detailed template are also publicly available in Latvian language: The UL Procedure for Preparation of Annual Study Field Reports(https://www.google.com/url?q=https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/3._STUDIJU_UN_ZINATNES_PROCESU_REGLAMENTEJOSIE_DOKUMENTI/Ikgadejo-parskatu-kartiba-2022-aptiprinata.doc&sa=D&source=docs&ust=1685263297489910&usg=AOvVaw2UkP0bj-7y5XNoO3f3Yro1). Feedback mechanisms are also set in place and are efficient. Feedback from students is collected twice a year and also after finishing the whole study programme, confirmed also from students and graduates. Feedback from these surveys is the main driving force of implementing changes and carrying out any discussions with staff members to improve their academic performance. (Annex 8. Analysis of student, graduate and employer survey results.) During the site visit students mentioned that a new approach to provide feedback is being implemented in the UL. After receiving any comments in study course surveys, lecturers before starting the course for the next students have to disseminate all the comments and what has been changed based on the previous surveys. This approach can be a good tool to encourage students to express their opinion even more. Staff members also confirmed that changes and direction of the study field is being discussed with them together with the administrative staff. Since some of the staff members are also working in the industry or in scientific institutes, they also can ensure the flow of information to the employers. Last conducted feedback from industry was during 2021 December until 2022 February. 11 Different employers replied to the survey and all of them required some additional knowledge in their specific fields and even more practical labworks to give students more necessary skills to enter the labor market more easily. (Annex 8. Analysis of student, graduate and employer survey results.) Feedback of changes implemented in study programmes for employers is given mainly through informal routes, such as through staff members that have double affiliation and are working in the respective company and through study programme director, which is one of his duties. (SAR, Part 2, Chapter 2.3.8., p. 68). Last survey of both study programme graduates was carried out from 2021 October till December. Mainly students were satisfied with the study programmes. One of the comments mentioned that work with more up to date technologies and equipment should be available. Experts concluded that in case of graduates feedback is not given back directly, because after graduation students are not that interested in the changes and development of the study programme. The ones that are more active are already involved in study programme as new teaching staff or guest lecturers. This is not considered an issue and does not undermine study programme quality.

1.2.3.

Students already before enrolment have the right to file a complaint about the admission procedure which is addressed to the chairman of the admission board. (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/3/26_Enrolment

_rules_at_the_UL.pdf). Furthermore, UL has recognized that student suggestions and complaints are a vital part of continuous development of the QA system, so they have renewed them at 28.09.2022. "Submitting and Examining Proposals and Complaints of the Students" (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/3_STU_DIJU_UN_ZINATNES_PROCESU_REGLAMENTEJOSIE_DOKUMENTI/6_STUDJO_1.PDF) (SAR, Part 2, Chapter 2.2.3., p. 39). Procedure describes how proposals and complaints are registered and reviewed. During the site visit students confirmed that they are aware of such regulation. They feel safe in case of problems to complain about staff members (SAR, Part 2, Chapter 2.2.3., p. 39) This document is also available in the ENG language. Similar regulation "The Procedure for the Organization of Study Course Examinations at the University of Latvia" (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/3/18_Procedure_for_organization_of_examinations_of_study_courses_at_the_University_of_Latvia.pdf) has been developed so that students can submit complaints about evaluation of final examinations. There are regulations that cover procedures to complain about graduation examinations, decision for exmatriculation, study fee relief decisions, granting academic leave or problems in UL dormitories (SAR, Part 2, Chapter 2.2.3., p. 40). It is worth mentioning that during the previous reporting period no student complaints have been received regarding the study field. SAR states that all issues so far have been resolved with discussions among all involved parties. If a student is not satisfied with the results of the complaint review process they also have the opportunity to resolve complaints in the Academic Court of Arbitration. Overall, experts conclude that mechanisms for submission of student complaints are in place and students in most of the cases can resolve all issues based on discussion. As described also in Chapter 1.2.2. Students can suggest changes to study course and whole study programme through surveys or by directly speaking to academic staff and study programme director. During the site interviews students did not display any concerns that their voice is not being heard in the administration of the study programme. They were satisfied with opportunities in all decision making bodies where student representatives are also involved in raising and resolving issues of study programmes.

1.2.4.

To maintain and support QA systems with continuous data input UL is collecting a lot of different information about students and study programmes from involved stakeholders within the scope of the study field. For example UL collects data about the number of applicants and their profile, number of students in the study programmes and exmatriculated students, reasons for abandoning studies, confirmed during student interviews. (SAR, Part 2, Chapter 2.2.1., p. 35) To monitor student performance data about students' grades as weighted average marks are collected and how well students are completing study programme. Additionally, it is mandatory for students to fulfill surveys each semester about each study course. UL also surveys students about their satisfaction at the start of studies, about the study programme, after graduation, and surveys for students who discontinue studies. All of the surveys are analyzed and based on analysis necessary changes can be made in the study programme syllabus (SAR, Part 2, Chapter 2.2.4., pp. 41-42). These mechanisms are sufficient for obtaining necessary information and have benefited study programme. For example, based on surveys from industry representatives and research institute members, the programme has undergone changes in composition of study courses in the reporting period (Annex 8. Analysis of student, graduate and employer survey results; SAR, Part 2, Chapter 2.2.3., p. 39). All of the involved parties have demonstrated interest into the further development of the Study Field and study programmes. Obtaining, monitoring and analyzing previously described criteria is helping to improve the Study Field.

1.2.5.

In the UL webpage in Latvian language version for Bachelors level programme all necessary

information can be found. (<https://www.lu.lv/studijas/fakultates/kimijas-fakultate/bakalaura-limena-studijas/kimija/>) Information about enrollment and study process corresponds to the information available in E-platform. There is also a section "additional information" where applicants can find all study courses in the study programme with full study course descriptions. This enables transparency and indicates openness to the information about the study process for potential applicants. For the Master level study programme also all information is available in the Latvian language (<https://www.lu.lv/en/studies/faculties/faculty-of-chemistry/graduate-studies/chemistry/>). Since the Masters study programme will also be implemented in English all information is also available in the English language. Currently there is no indication of a study programme being implemented in the English language. During the site visit, the study programme director indicated that as soon as the study field will obtain accreditation, the university will publicly announce the opportunity to apply for Master level studies in English language.

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

UL has established a working and sustainable quality policy, that is publicly available. Quality assurance system is well described and developed based on best practices. This system contributes to the achievement of the aims and learning outcomes of the study field and the relevant study programmes. Data obtained from the system analysis ensures development and improvement of the Study Field and programmes. Review process for the study programmes and the field is understandable for all involved parties. Feedback mechanisms to describe results are also set in place and ensure information flow between administration and academic staff. Feedback mechanisms to students, alumni and employers are working and none of these parties stated that they feel left out regarding newest updates of the study field and study programmes. UL collects a variety of different data that is being used to continue and develop field and programmes. All information about study programmes is published in the website of UL and fully corresponds to the information available to the experts in E-platform. Information is sufficient to apply for the studies.

Strengths:

1) Well developed and structured quality assurance policy and system with the handbook that ensures continued development of the study field and study programmes.

Weaknesses:

1) None.

Assessment of the requirement [1]

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

Assessment of compliance: Fully compliant

All criteria are fully compliant and fulfilled. Quality assurance system is working and enables continuous development of study field and study programmes while evaluating performance of students and academic staff members.

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

Assessment of compliance: Fully compliant

During the site visit UL demonstrated that university has developed sophisticated and properly working quality assurance system that is based on Quality policy, Quality Action Policy and Quality Management Handbook. (SAR, Part 1, Chapter 1.3. p.9.) These procedures are properly working and assure the quality of higher education in the UL.

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

Assessment of compliance: Fully compliant

First of all, biggest input for study field development is being analyzed through annual study field assessments, that is approved and overlooked through several governing bodies in the faculty and university. Procedure was briefly described from vice rector (SAR, Part 2, Chapter 2.2.2., pp. 36-37). Secondly, meetings with the industry and staff members are held to ensure up to date study programme syllabus, confirmed by study programme director. And also surveys of employers have been conducted. (Annex 8.) Thirdly, guidelines for preparation of new study programmes and analysis of existing ones are available in quality manual (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/2._POLITIKAS/LU_Kvalitates_politika_1_.pdf). All these mechanisms ensure development and supervision of study field and study programmes.

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

Assessment of compliance: Fully compliant

All study course descriptions (SAR, Annex 24_B Description of study courses and Annex 24_M Description of study courses) and university webpage prior to starting studies indicate all requirements to successfully pass each individual study course, study programme as whole and also describes how to achieve overall study programme learning outcomes. (https://www.lu.lv/studijas/studiju-celvedis/programmu-un-kursu-katalogi/programmu-mekletajs/?tx_lustudycatalogue_pi1%5Baction%5D=detail&tx_lustudycatalogue_pi1%5Bcontroller%5D=Course&tx_lustudycatalogue_pi1%5Bprogram%5D=21212&cHash=651a57ba64ed388258b931bf369ec1b1). Students also did not mention that they would have problems with their grading system, all involved parties are aware of the criteria to successfully achieve learning outcomes.

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

Assessment of compliance: Fully compliant

University has set in place UL Personnel Management Policy (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_EN/3/264_persona_vadibas_politika-en.pdf), that regulates procedures for assuring the qualification of staff members. Additionally, students through study course surveys also can evaluate staff members and such markings are taken into account. As mentioned from staff members for scientific work, supervision of thesis etc. motivation systems for good academic performance are set in place.

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

Assessment of compliance: Fully compliant

As describes in SAR Chapter 1.2.4. UL collects data about students starting from their application and even after graduation, during the study process the performance of academic staff is also monitored through student surveys and self-evaluation of study field annually. Employers can have direct input into the development of study programme through staff members and their connections to the industry. All involved parties provide information that has been used to analyse Study field.

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

Assessment of compliance: Fully compliant

UL has set several regulations to support the quality assurance system and it is aimed to perform continuous improvement involving all stakeholders. Development of study field is aligned with 6 year UL development plan and progress is being monitored annually through annual study field reports (SAR, Part 1, Chapter 1.3., p. 14).

1.3. Resources and Provision of the Study Field

Analysis

1.3.1.

The University of Latvia uses the state budget subsidy (taking into account the base funding, programme level and field of study) from the Ministry of Education and Science and tuition fees (SAR, Part 2, Chapter 2.3.1., p. 47).

The main costs are the remuneration of the teaching staff and the costs related to the organization of the study process.

Tuition fees at the University of Latvia are determined taking into the prime cost of the study place, tuition fees for similar programs at other universities, the interest of potential paid students in the study program, the estimated financing of the study place from the state budget, and the opinion of the UL Student Council (SAR, Part 2, Chapter 2.3.1., p. 48).

Tuition fees are set at the end of each year for the next academic year to ensure timely availability of information. The student's fee does not change during the studies, unless the fees vary from year to year in the programs, but even then they are all determined at the beginning of the studies (SAR, Part 2, Chapter 2.3.1., p. 48).

In order to estimate the amount of funds required for financial provision, the cost of study programmes at the University of Latvia is calculated according to the methodology developed by the University of Latvia, which takes into account the costs of providing the study process and information on the study programme plan, reliability of forecasts (SAR, Part 3, Chapter 3.3.3., p. 128). The developers of the master programme plan that 25 students will study in the English language programme, students could be from different countries, respectively, and with different tuition fees (for example, 6 students from the EU/EEA/Swiss citizens (fee 2200 EUR) and 19 students from countries outside the EU/EEA/Swiss citizens - tuition fee 5406 EUR). With such a planned number of students, the estimated full-time cost per full-time student of the MSP "Chemistry" is 4631 EUR per year and the total cost of the programme is 115,775 EUR per year (SAR, Part 3, Chapter 3.3.3., p. 130).

For curriculum development is used Income from lifelong learning or other services, as well as accumulated unit funds (SAR, Part 2, Chapter 2.3.1., p. 48).

The scientific activities of the Faculty of Chemistry are financed from several sources: the base and performance funding granted by the UL as a scientific institution, contracted research, projects funded by the Latvian Council of Science, ERDF projects, as well as from the Faculty's own income and from the state subsidy (SAR, Part 2, Chapter 2.3.1., p. 48).

Faculties manage their own funding within the current year's budget. The Dean of the Faculty and

the Executive Director are responsible for the rational use of financial resources and for operational financial management (SAR, Part 2, Chapter 2.3.1., pp. 48-49).

1.3.2.

The purchased equipment and apparatus are available and used in student teaching laboratories and for the research work of students and faculty members (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

The stock of the UL Library is regularly updated with the latest teaching and scientific literature (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

The laboratories are equipped with modern chemically resistant laboratory tables, fireproof solvent storage cabinets, ventilation is provided by a system equipped with local ventilation units on laboratory tables and fume cupboards (Waldner, Germany) (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

All lecture rooms are equipped with electronically controlled multimedia projectors, screens and laptops (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

The student teaching laboratories are equipped with modern teaching equipment, including analytical balances, pH meters and Karl Fisher titrator, thermostats, spectrometer and ATR frontier FTIR-spectrometer, various gas and liquid chromatographs (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

Students, in their laboratory work and especially in research projects and graduation theses, use the entire research infrastructure of the FC, including a high-performance liquid chromatograph/mass spectrometer with TOF detector, gas chromatograph/mass spectrometer, electrothermal atomic absorption spectrometer, inductively coupled plasma triple quadrupole mass spectrometer, differential scanning calorimeter, nuclear magnetic resonance spectrometer, powder X-ray diffractometers, thermo gravimeter, luminescence spectrometer (SAR, Part 2, Chapter 2.3.2., p. 50; On-site visit, April 24th, 2023).

Procurement procedures are organized in accordance with the Public Procurement Law and the rules established by the UL. The purchased equipment and apparatus are available and used both in student teaching laboratories and for the research work of students and faculty members. The stock of the UL Library is regularly updated with the latest teaching and scientific literature (SAR, Part 2, Chapter 2.3.2., p. 50).

1.3.3.

The basic principle of the library is the availability of its services to every user.

The Natural Sciences Library is open 24 hours a day, 7 days a week at students' convenience. The collection is open access. The Natural Sciences Library is housed in the House of Nature of the Academic Centre of the University of Latvia (Jelgavas street 1), with a total area of 662.80 m² (SAR, Part 2, Chapter 2.3.3., pp. 51-52; On-site visit, April 24th, 2023).

In the Natural Sciences Library, staff and students of the UL have the opportunity to use: free access to the collection, self-service facility for home delivery of books, renewal and check-out, computers, mobile phone charging.

The UL staff can check out the laptops at any time of the day and use them for 6 hours, not only in the library area, but in the whole building, using student or employee ID cards. All laptops are equipped with licensed software that students need for independent work: Wolfram Mathematica, MathWorks, MatLab, Autodesk Inventor, wxMacMolPlt, etc. Total 36 laptops (SAR, Part 2, Chapter 2.3.3., p. 51). The Library has more than 100 workstations, including 20 computer workstations (SAR, Part 2, Chapter 2.3.3., p. 52).

New acquisitions for the collection (acquisition of books, subscriptions for databases and periodicals) are conducted in accordance with the UL centralized funding, which is approved annually by a UL order.

In the period from 1 January 2013 to 4 February 2022 (date of data collection), the total number of new titles added to the UL Library collection was 617 in the field of chemistry, of which 305 titles are available in the Natural Sciences Library. The print collection includes books, serials, periodicals, PhD theses and abstracts in Latvian, English, German and Russian. Currently, the e-resource repository contains more than 5712 publications in the field of study "Chemistry, chemical technologies and biotechnology". In 2021, the UL provides access to 42 e-resource platforms (e-books platforms, e-journals databases and individual subscribed e-journals, reference resources and tools, mixed-format databases). In total there are 17 477 full-text e-journals (including the individual subscribed e-journal titles), 205 306 e-books, almost 5 million full texts and abstracts of doctoral and master's theses from around the world available through subscriptions. The UL also provides links to 174 credible open-access databases with multi-format materials (SAR, Part 2, Chapter 2.3.3., pp. 52-53). The UL Library regularly provides trial access to various databases, with an average of 10-15 trial accesses per year (SAR, Part 2, Chapter 2.3.3., p. 54).

The library collection in general corresponds to the implementation of studies and the development of research, as its stocks are supplemented every year with the latest information resources in accordance with the information needs of the academic staff and students (SAR, Part 2, Chapter 2.3.3., p. 56).

1.3.4.

The Department of Information Technology of the UL provides the UL students and employees with an application package Microsoft (henceforth – MS) Office 365, a cloud technological solution. Office 365 provides students and employees with the best tools for modern study work, for example, Outlook, Forms, OneNote, Sway, and a package of Office programmes containing Word, Excel, and PowerPoint, also SPSS, Question Pro, Autodesk, MathWorks MatLAB, Esri ArcGis, etc (SAR, Part 2, Chapter 2.3.4., pp. 56-57).

In addition to MS Teams programme for the online study process, the UL offers its students and employees an information system BigBlueButton (hereinafter – BBB system), It can also be used as an integrated solution for e-study system (for only registered users in the course) and outside an e-study system, in which case one must connect to the UL online conference server in a web browser (SAR, Part 2, Chapter 2.3.4., p. 57).

The open-source e-study environment Moodle, a modular object-oriented dynamic learning environment, is used for both e-study environments. Courses have been developed in the Moodle e-study environment, where the necessary study materials and activities for students are available. There the teaching staff can assess students and register study attendance. All study courses have e-learning courses in Moodle environment; e-learning courses have a study calendar, study materials, mainly in Latvian and English, tests and assessment tools, as well as other tools available on the Moodle platform. The MS Teams environment is used for distance learning in situations when this is necessary, and in some cases, when guest lecturers are present (SAR, Part 2, Chapter 2.3.4., p. 57).

The ZOOM and BBB platforms are used. These platforms allow both lecturers and students to present their work, conduct and listen to theoretical classes, seminars, send messages and exchange electronic documents (SAR, Part 2, Chapter 2.3.4., p. 57).

1.3.5.

There are three teaching groups at the UL: academic staff who hold their academic positions for a limited period of tenure on the basis of elections; acting academic staff and visiting academics, as well as hourly-paid staff.

In the case of elected academic positions, as well as the acting academic staff, the recruitment and selection are regulated by the Regulatory enactments on academic and administrative positions at the University of Latvia. According to the regulations, the following academic positions exist at the

University of Latvia: professor, associate professor, assistant professor, senior researcher, lecturer, researcher, assistant, research assistant (SAR, Part 2, Chapter 2.3.5., p. 58).

Public calls for applications for the elected academic positions, including the function and terms of reference for the respective position, are published on the UL website <https://www.lu.lv/par-mums/vakances/> (available only in Latvian), internationally advertised vacancies: <https://www.lu.lv/en/about-us/vacancies/>, and also in National Scientific Activity Information System and State Employment Agency of the Republic of Latvia vacancy portal (SAR, Part 2, Chapter 2.3.5., p. 58). In accordance with the UL regulations, minimum requirements are set for all applicants for academic positions, i.e. knowledge of the official language in accordance with regulatory enactments, knowledge of foreign languages to the extent necessary for the performance of academic duties and continuous improvement of their academic and scientific qualifications. Other requirements differ across academic positions, for instance, to qualify for the position of Assistant Professor, the candidate has to have a doctoral degree, while the requirements for Associate Professors are more demanding, i.e. they must have considerable academic and pedagogical 59 experience, an extensive list of publications and experience in scientific research projects (SAR, Part 2, Chapter 2.3.5., p. 58).

A total of 50 teaching staff have been recruited for the two study programmes prepared for the accreditation. 29 academic staff members work at the FC, all of whom are elected to academic positions. 13 lecturers are elected to academic positions at other faculties of the UL, 2 lecturers at other universities, and 6 specialists in the field are teaching courses as hourly-paid lecturers (SAR, Part 2, Chapter 2.3.5., p. 59).

The process of election and selection of lecturers is fully open, the qualifications of candidates are evaluated several times and experts are involved, decisions on election are made by collegial bodies, which makes the process as transparent as possible and allows selecting qualified specialists to successfully implement the objectives of the study field (SAR, Part 2, Chapter 2.3.5., p. 59).

The SAR (Part 2, Chapter 2.6., pp. 98-100) and Annex 18 contain detailed information on changes made by UL and FC on the basis of the Joint expert report (2011) with regard to safety and infrastructure improvements. For example, the transfer of FC to the new House of Nature in The Academic Centre of UL and a good level of modern equipment (SAR, Part 3, Chapter 3.3.1., p. 126; SAR, Part 3, Chapter 3.3.1., pp. 163-164; On-site visit, April 24th, 2023) allow to carry out experimental work for domestic students. These facilities can be attractive for foreign students to come to UL for research activities and/or the study process. Upgrading of the equipment is an ongoing process that depends on available funding.

In the UL exists the motivation system for the personnel (SAR, Part 2, Chapter 2.4.4., p. 86; On-site visit, April 24th, 2023) to publish the results in high-ranking international journals. The system allowed an increase in the number of scientific articles published in high-ranking international journals (Q1/Q2) during the last years (SAR, Part 2, Chapter 2.4.4., pp. 85-86; SAR, Annexes, List of the publications, patents, and artistic creations of the teaching staff over the reporting period).

According to the recommendations of the Joint report of experts (2011) the exchange of students and academic staff should be developed. New ERASMUS contracts, created mobility plans, and preparation of study courses for teaching in English were realized (SAR, Part 2, Chapter 2.6.1., p. 99; SAR, Annexes, 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) but the number of outgoing/incoming students and staff is very low (1-3 per year, SAR, Annexes, Annexes, Statistical data on the incoming and outgoing mobility of students).

As postulated in SAR (Part 2, Chapter 2.6.1., p. 99) and Annex 18 (SAR, Annexes, 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) the overlapping of some courses in

the Bachelor's and Master's programmes has been removed and some of MSPC courses were modified. A major criticism provided by recommendations received during the previous assessment procedure (Joint report of experts (2011), p. 3) was connected with the absence of a significant difference between the Master's program and the Bachelor's program due to the compressed studies for MSPC students (in 2 days weekly). No significant changes were done in the schedule of MSPC students: the studies for MSPC students are compressed practically in 2 days weekly (On-site visit, April 24th and 25th, 2023).

Recommendation to provide information about different companies is fulfilled by the organization of the regular annual meetings with potential employees (SAR, Annexes, 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).

FC staff actively participates in the creation of the Secondary school chemistry programmes as experts and in the teaching of the students in a new teacher program of UL.

Introduction of cross-disciplinary lectures recommended during the previous assessment procedure (Joint report of experts (2011), p. 5) was substituted by "Coordinating course content (theory and practical part), indicating prior knowledge" and "Content analysis and coordination of BSPC courses with courses of other fields (physics, biology, higher mathematics)" (SAR, Annexes, 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 field).

1.3.6.

The professional development of the UL academic staff is organized in accordance with the Republic of Latvia Cabinet regulations No. 569, Regulations on the Necessary Academic and Professional Qualifications of Pedagogues and Professional Competence Development Procedures, where paragraph 16 states: "Educators of higher education and colleges shall, by the end of the term of their election, undertake a vocational development programme on innovation in the higher education system, or the higher education didactics, or the management of educational work at 160 academic hours (including at least 60 contact hours).

Professional development may include international mobility and participation in conferences and seminars relevant to the purpose of professional development.

The Academic Department of the UL and the Adult Pedagogical Education Centre of the Faculty of Education, Psychology and Art (FEPA) of the UL provide informative, consultative and methodological support to the UL academic staff in the field of the higher education didactics, for example, professional development programme "Didactics of Higher Education: modern theories and practices", as well as continuing education programmes "Pedagogical aspects of the development of study programmes in higher education", "Professional development advising first-year students" (SAR, Part 2, Chapter 2.3.6., p. 60).

When planning the growth and development of the academic staff, the UL pays equal attention to the identification of the most capable students in the study programmes of the UL and to motivating them to get involved in academic work already during their studies (related to both teaching and research). All acquired knowledge and skills are an important factor in the realization of the goals of the development of the study field, for example, the improvement of the English language skills is essential in the internationalization of further activities (SAR, Part 2, Chapter 2.3.6., p. 63).

During the reporting period and especially in the last two years, there has also been a threefold increase in participation in various professional development courses and training. Lecturers actively participate in scientific conferences, which increase their professional skills. The systematically planned and offered qualification improvement opportunities for the teaching staff of the study field are essential for the implementation of the study process and the improvement of its quality (SAR,

Part 2, Chapter 2.3.6., p. 65).

According to the experts, UL takes care of the professional and didactic development of the teaching staff. This is done primarily through the Academic Department of the UL and the Adult Pedagogical Education Center of the Faculty of Education, Psychology and Art (FEPA), which design and ensure appropriate improvement measures. In addition, based on analyzes conducted through surveys and other forms of monitoring the work of the teaching staff, it is ensured that the professional and didactic development of the teaching staff is focused on the needs of the study program, with the fundamental goal of continuous improvement of the entire educational system at UL.

1.3.7.

In total, 50 teaching staff are involved in teaching courses. 82% of them are in elected positions at the UL, 39 of them have doctoral degrees, i.e. 78% of the total number, and the rest have master's degrees, which indicates the high qualification of specialists (SAR, Part 2, Chapter 2.3.7., p. 65).

The workload of all elected UL staff members consists of academic and scientific research work. Teaching work of lecturers includes reading lectures, work in laboratories and seminars, as well as preparation of methodological materials, management of final theses, assessment of student achievements, etc. The average distribution of the total academic and research workload of the Faculty of Chemistry is 53% and 47% (SAR, Part 2, Chapter 2.3.7., p. 66).

In addition to academic work, all lecturers' workload includes scientific research work, which also incorporates an organizational component. The administration of the FC carefully monitors the balance between teaching and research and tries to attract funding. Results of scientific work are one of the most important criteria for evaluating the quality of the work of the academic staff (SAR, Part 2, Chapter 2.3.7., p. 67).

1.3.8.

The aim of academic support is to provide students with information and advice on study issues for the entire period of studies. Academic support includes the implementation of the first year of studies support programme, advice on the study process (content of study programme, choice of study courses, legal documents regulating the UL study process), information on tutorials, consultations and workshops on study skills (note taking, reading for academic purposes, active listening, exam anxiety, time management, libraries and Internet resources). Academic support in study matters is managed centrally by the UL Department of Study Services and the responsible persons with the respective faculties: director of the study programme, study advisor, trustee, mentor, coordinator, academic staff, and the UL Students' Council and Faculty Students' Councils. Advice on the use of library and Internet resources is provided by the UL 68 Library. The University of Latvia Library provides consultations on the use of the library and Internet resources. Table 10 displays examples of key tasks to be performed by student support units/ staff (SAR, Part 2, Chapter 2.3.8., p. 67).

Psychological support is provided by the Study Service Department. A psychologist-consultant provides psychological support to students in solving personal and study issues arising from studies (relationship issues, conflict resolution, and emotional difficulties). A psychologist provides individual and telephone consultations.

Special events aimed at integrating domestic and international students are organized in cooperation with the ESN (Erasmus student network), thus introducing international students to Latvian culture and traditions and promoting international and domestic student interactions.

The International Relations Coordinator of the Faculty is responsible for the successful implementation of international exchange programmes (Erasmus, Erasmus+, etc.) and mobility processes (SAR, Part 2, Chapter 2.3.8., p. 69).

All students are provided with a minimum of two hours of consultations each week with the lecturer of each study course, to enable them to discuss any unclear issues in person (SAR, Part 2, Chapter

2.3.8., p. 69).

Students can also receive advice on any study-related issue and social life of students from the Faculty's Study secretary at the Study Information Centre of the House of Nature. The most common questions are how to re-register for study courses, get clarifications on course papers/projects, apply for course recognition, etc. (SAR, Part 2, Chapter 2.3.8., p. 69).

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

UL has a strong provision of resources: they have a well qualified teaching staff and fully purchased equipment park. The equipment and apparatus are fully available for research works and for student teaching. All lecture rooms are equipped with electronically controlled projectors, screens and laptops. The library is fully open to every user. There are wide, open spaces, where to study and use all accessible resources. UL full-fledged use e-study environment Moodle. Teachers successfully developed courses in the Moodle environment. UL provides comprehensive support to its students during their studies (information and advice on study matters throughout their studies, psychological support, consultations with lecturers, etc.).

Strengths:

1) UL has highly qualified teaching staff.

Weaknesses:

1) None.

1.4. Scientific Research and Artistic Creation

Analysis

1.4.1.

A development plan for the study field Chemistry, Chemistry Technologies, and Biotechnology is based on University of Latvia strategy 2021-2027 (<https://bit.ly/3BqBGxh>), in which one of the main goals is to ensure international recognition of the scientific research in the field of nanotechnologies (ChemNano), in the field of medicine and life sciences (MedLS) and finally for Development of innovative instrumental analytical methods (InAnMet) (SAR, Part 2, Chapter 2.4.1., pp. 70-71). To achieve the goal, the work started in the previous planning period continued focusing on achieving the highest-level scientific excellence, as well as promoting student-oriented studies (SAR, Part 2, Chapter 2.4.1., p. 71).

The study programs have been developed in close collaboration with research institutions and the industrial sector and improvements done since last accreditation were based on the initiatives of potential employers and the teaching staff. Yearly meetings with stakeholders are held where changes to the programs are discussed and planned. Graduates of the programs are well-recognized by employers, who also state that the study programs ensure sufficient competencies, knowledge and skills needed for entering the labor market. There is a high demand for students of the Faculty on the labor market as well as at various research institutes, for instance Institute of Chemical Physics (ICP) or the Latvian Institute of Organic Synthesis (LIOS) (on-site interview with employers, April 24th and 25th, 2023).

Students are highly motivated and very satisfied with both study programs and the possibilities for research and professional development their education offers them. They feel involved in the new development of the study program, mainly by filling out surveys and attending student council. There was also a student group working together with lecturers on improvements when the new programs were being created (on-site interview with students, April 24th and 25th, 2023).

Faculty offers students a connection to institutes and industry and specially the master's program is

based on the research activities of the teaching staff which is a great foundation for future professional development of the graduates (on-site interview with staff and students, April 24th and 25th, 2023).

1.4.2.

Scientific research of teaching staff and students for both study programs is carried out at the FC, as well as in other research institutions such as the Institute of Chemical Physics (ICP), the Latvian Institute of Organic Synthesis (LIOS), the Institute of Food safety, Animal Health and Environment "BIOR" and UL Institute of Solid State Physics (ISSP), Latvian State Forest Research Institute "Silava", Latvian State Institute of Wood Chemistry, Latvian Institute of Aquatic Ecology, Institute of Agricultural Resources and Economics, The Institute of Horticulture and also with international research institutions such as Masaryk University in Brno, University of Warsaw, Jožef Stefan Institute in Ljubljana and the Estonian Environmental Research Centre in Tallinn (SAR, Part 2, Chapter 2.4.1., pp. 70-71).

In 2015, UL developed a research program for 2015-2020 which included program for research in UL in line with LU's future strategic plans 2021-2027 (<https://bit.ly/3BqBGxh>) in the field of chemistry and nanotechnologies (ChemNano), in the field of medicine and life sciences (MedLS) and finally for Development of innovative instrumental analytical methods (InAnMet) (SAR, Part 2, Chapter 2.4.1., pp. 70-71). While the bachelor study program consists of basic courses suitable for this level of studies such as analytical and physical chemistry, mathematics and biology (Annex 23B- Study program plan), the masters program is beside follow-up courses such as Inorganic chemistry or Physical chemistry of solid materials focused on areas close to the ongoing scientific research such as Advanced analytical methods, Organic synthesis I, II and III or Medicinal chemistry (Annex 23M - Study program plan)

Scientific results in the form of publications and patents are listed in SAR, Annex 14, List of publications and patents for the reporting period where at least five papers are given for the majority of the lecturers. The most important papers published from the FC are also given in SAR (Part 2, Chapter 2.4.1., p. 76).

Master's study program prepares students well for respective PhD studies, students mentioned especially readiness in Organic chemistry (on-site interview with students, April 24th and 25th, 2023). It is easy to proceed to PhD level of studies if the student decides for that path. Beside chemistry, MA students can proceed to studies in Biology and Physics (on-site interview with students, April 24th and 25th, 2023).

1.4.3.

International collaboration and publication of joint scientific articles is realized as joint implementation of international scientific projects listed in SAR (Part 2, Chapter 2.4.3., pp. 81-83). International collaboration is also implemented without mutual financial obligations in the form of scientific mobility or exchange of experience. Detailed information on such projects is given in SAR, Annex 13 "Summary of quantitative data on scientific and applied research activities in the reporting period", where projects are divided into international such as Horizon 2020 or COST, several national projects financed by the Latvian Council of Science and individual postdoctoral projects.

Closer cooperation is established with University of Montpellier, France, CERN, Rostock University and Leibniz Institute for Catalysis, Johannes-Gutenberg-Universitat, Pfizer Inc., USA, or St. Petersburg State University in the form of staff and student mobility and projects resulting in joint scientific publications (SAR, Part, 2, Chapter 2.4.3., p. 82).

Another way that FC promotes international cooperation is participation and organization of scientific conferences. The conferences organized between 2016 and 2021 are presented in SAR, Annex 13 "Summary of quantitative data on scientific and applied research activities in the reporting period" such as International 12th Paul Walden symposium in organic chemistry, Riga, September

19-20, 2019 or annual International Scientific Conference of the UL Section of Organic Chemistry, Analytical Chemistry and Physical Chemistry.

The international scientific recognition of the teaching staff of FC is also indicated by the invited presentations at international scientific conferences and the working in the editorial boards of scientific journals (SAR, Part, 2, Chapter 2.4.3., p. 83).

Both study programs benefit from international scientific cooperation and participation in international projects, because both of these programs are taught by lecturers involved in such cooperation and project implementation, thus increasing their knowledge and competence. SAR (Part, 2, Chapter 2.4.3., p. 83) lists the most important directions of research with international cooperation, namely nanomaterials for applications in energy and sensors (courses "Nanochemistry" BSPC, "Microscopy Methods" MSPC); innovative materials for energy ("Energy Containment Chemistry" BSPC, "Radiation Chemistry" MSPC); structure and interactions of therapeutic target proteins and biologically active substances ("Nuclear Magnetic Resonance Spectroscopy" MSPC, "Molecular Computer Modelling" MSPC, Biomolecular Structure, MSPC); synthesis of natural products and their analysis, as well as development of methodology for natural product synthesis ("Heterocyclic Compounds" BSPC, "Electrochemical Synthesis" MSPC, Chemistry of Natural Compounds MSPC, Organic Synthesis III MSPC etc.); development of innovative instrumental analytical methods ("Principles of Food Chemistry" BSPC, "Methods of Electrochemical Analysis" MSPC, Practical Applications of Advanced Elemental Analysis MSPC).

1.4.4.

UL has developed mechanisms for the involvement of the teaching staff in scientific research. They are well-functioning and efficient. There are three teaching groups at the UL: academic staff who hold their academic positions for a limited period of tenure on the basis of elections, acting academic staff and visiting academics, as well as hourly-paid staff (SAR, Part 2, Chapter 2.3.5., p. 58).

The applicants for academic positions must deliver an open lecture, which is evaluated by two reviewers, who issue their opinion on the quality of the lecture. The election procedure is carried out either by the decision-making body of the relevant unit (in the case of assistants, research assistants, researchers, senior researchers, lecturers and assistant professors - by the Faculty Council), or in the case of associate professors and professors by the relevant Professors' Council.

In accordance with the UL regulations (https://www.lu.lv/fileadmin/user_upload/LU.LV/www.lu.lv/Dokumenti/Dokumenti_LV/5._DAZADI/SL_2-3-11-2022__Nolikums_par_akad_l_1_.pdf), among the minimum requirements is also continuous improvement of their academic and scientific qualifications. Other requirements differ across academic positions, for instance, to qualify for the position of Assistant Professor, the candidate has to have a doctoral degree, while the requirements for Associate Professors are more demanding, i.e. they must have considerable academic and pedagogical experience, an extensive list of publications and experience in scientific research projects (SAR, Part 2, Chapter 2.3.5., p. 58).

The UL Strategy 2021-2027 emphasizes that the goal of the development and excellence-oriented personnel policy is to ensure the development, growth and renewal of academic and general personnel, to create a performance-based personnel management system, which will also include competitive and motivating personnel remuneration, to improve academic staff career development opportunities, to create a system for attracting local and foreign academic staff, as well as new talents, and to promote international mobility (SAR, Part 2, Chapter 2.3.6., p. 60).

The teaching staff are granted a balanced workload consisting of both academic and scientific research work (53% and 47%, respectively). Teaching work of lecturers includes reading lectures, work in laboratories and seminars, as well as preparation of methodological materials, management of final theses, and assessment of student achievements. Scientific research work also incorporates an organizational component. The administration of the FC carefully monitors the balance between

teaching and research. Results of scientific work are one of the most important criteria for evaluating the quality of the work of the academic staff. The active involvement of the programme's staff in research is evidenced by the large number of publications in the most important databases and their participation in projects and conferences (SAR, Annex 9 "Basic information on the teaching staff involved in the implementation of the field of study"; SAR, Annex10 "Teaching staff biographies - Curriculum Vitae", SAR, Annex 14 "List of publications of the teaching staff for the reporting period"; SAR, Part 2, Chapter 2.3.7., p. 66).

1.4.5.

Students of both bachelor's and master's study programs are closely involved in the implementation of scientific research projects most often financed by ERDF, Latvian Council of Science FARP, National research program, as well as international scientific projects such as Horizon 2020 or COST (SAR, Part 2, Chapter 2.4.3., p. 81 and Annex 13, "Summary of quantitative data on scientific and applied research activities in the reporting period"). Most students work on the projects both to gain experience and finance their studies already from bachelor level (interview with students, April 24th and 25th, 2023). The FC students work on their research projects and final theses within the framework of these projects. Students' involvement in scientific research is also evidenced by their participation in scientific papers and conferences, both by independently presenting their own research and participating as co-authors of broader research teams (SAR, Annex 14, List of publications and patents for the reporting period). The number of abstracts for presentations at various scientific conferences organized in the region in which among the authors there are FC students are summarized in Table 17 (SAR, Part 2, Chapter 2.4.5., p. 87).

1.4.6.

Innovations have been introduced in areas such as marketing, infrastructure, teaching process and information technologies in 2016 - 2021. A public relation specialist has been employed in this time period, UL Department of Communication is responsible for marketing of the study programs which are also advertised in cooperation with other Natural sciences study programs and the study field is closely coordinated for better efficiency (SAR, Part 2, Chapter 2.4.6., p. 89).

FCy has been relocated to newly built Torņakalns academic centre of the UL which greatly benefits the concept of modern campus. The relocation to new facilities has also led to significant modernization of both scientific and student laboratories, excellent student premises, well-equipped library, modern lecture hall and classrooms (on-site visit, April 24th and 25th, 2023).

During the COVID-19 pandemics an active implementation of remote studies and improvement of learning materials, including the creation of video recordings of lectures has been achieved with the aim of creating a student-centered study process (SAR, Part 2, Chapter 2.4.6., p. 90; interview with teaching staff and students, April 24th and 25th, 2023).

The UL Information System LUIS is being improved together with innovations of the study e-environment, including linking it to the remote study implementation platform MS Teams. Selected software was made available to all FC students such as Microsoft Office 365, Gaussian 09 and Gaussian 16, MathWorks MatLAB, Wolfram Mathematica, SPSS, ThomsonReuters EndNote (SAR, Part 2, Chapter 2.4.6., p. 90).

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

The directions of scientific research of the Study Field correspond to the development goals of the higher education institution and are relevant for the study field and industry. UL has developed mechanisms for the involvement of the teaching staff in scientific research. They are well-functioning and efficient. The connection of scientific research to the study field with the study process is logical and justified. Scientific research and the outcomes thereof are integrated in the

study process in both evaluated study programmes. UL has developed mechanisms to promote the involvement of the students in scientific research. They are well-functioning and efficient. Innovative solutions are applied in the study field, which have a significant positive impact on the study process.

Strengths:

- 1) Both study programs have been developed based on recommendation from industry representatives and the teaching staff.
- 2) Excellent competitiveness and skills in graduates, strong name on the labour market
- 3) General student satisfaction with opportunity to participate in ongoing scientific projects
- 4) Competent, scientifically involved teaching staff

Weaknesses:

None.

Assessment of the requirement [2]

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

Assessment of compliance: Fully compliant

The directions of scientific research of the study field correspond to the development goals of the higher education institution and are relevant for the study field and industry. UL has developed mechanisms for the involvement of the teaching staff in scientific research (SAR, Part 2, Chapter 2.4.).

1.5. Cooperation and Internationalisation

Analysis

1.5.1.

FC is an important scientific research center with long traditions, cooperation with many partners (scientific institutes, companies and universities) has been established over a long period of time. Partners cooperation has developed, first of all, by solving common current scientific problems. Many cooperation partners (JSC Grindeks, Olainfarm, the Bior Institute) are also employers, and cooperation takes place by systematically updating study programs in order to prepare qualified specialists for the labor market. Cooperation agreements are one of the mechanisms for attracting cooperation partners. Currently, 9 contracts have been concluded with cooperation partners for the development of students' final theses. The implementation of chemistry study programmes is carried out in close cooperation with employers, inviting representatives of employers - high-class specialists (SAR, Part 2, Chapter 2.5.1., pp. 90-91).

Scientific cooperation with other faculties and scientific institutes of the University of Latvia is carried out at all levels of the programmes, developing research projects and bachelor's and master's theses: the Faculty of Geography and Earth Sciences, Faculty of Biology, Faculty of Medicine, Faculty of History and Philosophy, Institute of Solid State Physics, Institute of Physical Chemistry, Institute of Atomic Spectroscopy (SAR, Part 2, Chapter 2.5.1., pp. 91).

Cooperation between UL and RTU dates back to the last century. The Faculty of Chemistry of the UL has close cooperation with the Faculty of Materials Science and Applied Chemistry. For many years, there has been an agreement with RTU on the takeover of study programmes in case of liquidation. Cooperation also takes place in the study process. In the MSP "Chemistry", in the subdirection "Organic and Biomolecular Chemistry" professors give lectures jointly in the study courses "Organic

Synthesis II" (lectures by UL) and "Medicinal Chemistry" (lectures by RTU) to students of both universities (SAR, Part 2, Chapter 2.5.1., pp. 91).

In cooperation with employers, current chemistry problems are solved and research projects and final theses are developed. Every year, students of Bachelor and Master programmes develop their final theses not only at the UL, but also at scientific institutes and companies: the Latvian Institute of Organic Synthesis, the Institute of Wood Chemistry, RTU, the BIOR Institute, as well as in cooperation with Grindeks, Olainfarm, Groglass Ltd. and other institutions. The final work is usually supervised by specialists from these institutions together with the academic staff of the faculty.

Employers support students granting them periodic scholarships. This is usually done through the UL Foundation. Students have received scholarships from companies Valpro, Olainfarm, Mikrotikls (SAR, Part 2, Chapter 2.5.1., p. 92).

The implementation of chemistry study programmes is carried out in close cooperation with employers, inviting representatives of employers - high-class specialists - as guest lecturers (from JSC Grindeks, LOSI) (SAR, Part 2, Chapter 2.5.1., pp. 91).

Nine agreements are signed with industrial companies and institutes for cooperation in the development of research projects and theses. The academic staff and students of the study programme participate in joint research and applied projects, scientific conferences and seminars with employers (SAR, Part 2, Chapter 2.5.1., p. 92).

One of the objectives of the Development plan of the study field is to guide staff towards excellence and collaboration in science, industry, society and teaching. Secondly, many cooperation partners are also employers, and cooperation takes place by systematically updating study programs in order to prepare qualified specialists for the labor market (SAR, Part 2, Chapter 2.5.1., p. 92).

1.5.2.

According to the experts, cooperation with various foreign institutions in the study field is in line with the achievement of the development goals of the study field, the implementation of the relevant study programmes of the study field and related research. Partners are also selected by analyzing the content, structure, language of teaching, etc. of university study programmes, so that students can successfully go on exchange studies in both directions.

In the field of Chemistry 26 Erasmus+ cooperation agreements have been signed with universities in 12 European and EEA countries. The FC also actively took part in the implementation of bilateral cooperation agreements with countries such as Kazakhstan, South Korea, Taiwan, South Africa, Bangladesh (SAR, Part 2, Chapter 2.5.2., p. 93).

According to the specifics of the study field, the FC has Erasmus+ agreements with Vilnius University, Tartu University, Kaunas University of Technology, Rostock University, Masaryk University, Aristotle University of Thessaloniki, etc. Regular exchanges of guest lecturers and students take place with these universities. The academic staff of the FC have also participated in international projects related to the quality of the study process, for example, Erasmus+ project Enhancing capacities in implementation of institutional quality assurance systems and typology using Bologna process principles, Feasibility study for a European forum for Enhanced Collaboration in Teaching (SAR, Part 2, Chapter 2.5.2., p. 94).

To further improve the study program, the academic staff continuously participates in the work of various international professional organizations. Of particular importance is participation in the work of the European Chemistry Thematic Network Association (ECTNA), an association that brings together more than 120 members from universities and institutes in 30 European countries. Based on the evaluation carried out by ECTNA experts, which refers to the assessment of content, outcomes, teaching methods, organization and everything related to the quality of study programs in the field of chemistry, the study programs of FC received the prestigious designation "Chemistry Eurobachelor" and "

"Chemistry Euromaster" (SAR, Part 2, Chapter 2.5.2., p. 94).

1.5.3.

The information on the concluded Erasmus+ agreements and other forms of cooperation is regularly updated on the website of the UL. Information is also available on the faculty notice board. Students for the exchange programmes are selected on the basis of three main criteria: study results, student motivation and foreign language proficiency (SAR, Part 2, Chapter 2.5.3., p. 95).

Bachelor students are regularly informed in person about studying abroad: starting with the open day events, then at information events during their first year. Periodically, students meet participants from previous years' exchange programmes. After the sessions, bachelor students who have high academic performance, are also personally approached to explain the benefits and the possibilities of the exchange programmes. Master's students are approached individually already during the enrolment process and at the time of signing the contracts, when the choice of the subdirection of the Study Field, students' interests, and their wishes and possibilities to study abroad are discussed.

According to the experts, the mobility of both students and teaching staff is unsatisfactory. Students stated that they do not participate in foreign exchange programs due to their work commitment. Some employers are understanding but others do not permit a year-leave. Other issues are related to funding, as scholarships in ERASMUS are not sufficient anymore, or limitations of finding another job after the exchange (on-site interview with staff and students, April 24th and 25th, 2023; SAR, Annexes, Statistical data on the incoming and outgoing mobility of students).

Students also thought that the low number of incoming students can be due to no MSPC in English; staff agrees that the planned opening of such a program could attract more foreign students. Simultaneously, with more foreign students there would be more options to international networking and improved language skills could mean more students would choose to join student exchange programs. Employers are partially inclined to let students leave for the exchange program, they agree this benefits the students and gives them more skills. Companies with connections abroad consider organizing international courses for employees (on-site interviews with students and employers, April 24th and 25th, 2023).

The main reason that discourages UL students from taking part in the Bachelor exchange programme is their foreign language skills, as most of the Bachelor programmes are in national languages and only some courses are offered in English. The most common obstacle to participation in exchange studies for Master's students is research work, as most students are involved in different research projects after graduating from the Bachelor programme and they do not want to lose their jobs. In some cases we have been in contact with the employers of these students and the results have been positive (SAR, Part 2, Chapter 2.5.3., p. 95).

Compared to the previous accreditation period, the number of incoming foreign exchange students in the programmes of Study field has increased, but is still relatively small (SAR, Part 2, Chapter 2.5.3., p. 96).

The FC produces information materials and makes sure that students have access to information in English, where they can find out about the courses offered, application procedures and other issues of interest to foreign students (SAR, Part 2, Chapter 2.5.3., p. 96).

However, the number of international exchange students has been 1-2 students per one study course, therefore laboratory practice and seminars in English are provided in joint groups, while lectures are replaced by tutorials, providing students with textbooks and teaching materials. This is also the experience of many partner universities, especially in Bachelor's programmes in Germany, France, Greece, etc (SAR, Part 2, Chapter 2.5.3., p. 96).

All in all, the interest of foreign students in the MSP "Chemistry" is twofold. Firstly, potential exchange students are mainly interested in research work and would be willing to study courses in English. The second group of students is interested in the possibility of studying the full Master's programme (up to about 10 students each year). Therefore, the Master's programme is planned to offer entirely in English, so that English groups can be formed and exchange students can freely join

them (SAR, Part 2, Chapter 2.5.2., p. 97).

According to the staff (on-site interview, April 24th and 25th, 2023), the mobility of teaching staff is rather low, it is financially difficult to attract foreign lecturers, some help comes from EU funding and there is a plan to work towards increased mobility at the FC (SAR, Annexes, Statistical data on the incoming and outgoing mobility of the teaching staff).

During the reporting period, foreign guest lecturers visited to give lectures to students of different levels and programmes (SAR, Part 2, Chapter 2.5.2., p. 97). One of the problems is the lack of time. It is very difficult for an active lecturer to find time for a week-long visit. Thus, remote lectures offer more opportunities in this area. It is planned to make active use of them in the future (SAR, Part 2, Chapter 2.5.2., p. 98).

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

Cooperation with local and foreign institutions is close in both directions. Students already at the first years of studies are involved in research or find a job in local companies. UL selected their partners by study programmes, so that students can successfully go on exchange studies in both directions. Exchange students are mainly interested in research work. Incoming and outgoing mobility of students and academic staff is not sufficient.

Strengths:

1) UL has close cooperation with local companies, institutes, and other Universities.

Weaknesses:

1) Mobility of students and teaching staff, both incoming and outgoing is low and should be further developed and encouraged.

Assessment of the requirement [3]

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

Assessment of compliance: Fully compliant

Scientific cooperation with other faculties and scientific institutes of UL is carried out at all levels of the programmes, developing research projects and both study levels theses (SAR, Part 2, Chapter 2.5.1., p. 91). Collaboration with institutes and the business community, established at the national level, enables the efficient implementation of study programs and the acquisition of learning outcomes by students (SAR, Part 2, Chapter 2.5.1., p. 9093). Signed agreements with foreign higher education institutions form the basis for the mobility of students and teachers. Particularly important is the cooperation with ECTNA, which enables the evaluation of study programs in the field of chemistry, resulting in the acquisition of the "Chemistry Eurobachelor" and "Chemistry Euromaster" quality labels (SAR, Part 2, Chapter 2.5.2., p. 93-94). Mobility of students and teaching staff, both incoming and outgoing, is low and should be further developed and encouraged (SAR, Annexes, Statistical data on the incoming and outgoing mobility of students; Statistical data on the incoming and outgoing mobility of the teaching staff).

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

Analysis

1.6.1.

Recommendations to the Study field, 2013 - after accreditation:

1. Laboratory work safety measures should be improved.

In experts' opinion the recommendation is fulfilled. The recommendation was fully considered and implemented when FC moved to the new House of Nature in The Academic Center of UL. Additional health and safety information for laboratory work and an additional electronic testing system for students and staff at UL (centralized) were also developed.

2. The infrastructure of the faculty needs improvements.

In experts' opinion the recommendation is fulfilled. The recommendation was fully considered and implemented when FC moved to the new House of Nature in The Academic Center of UL. In addition, beginning in the 2015/2016 academic year, new scientific equipment was purchased and collaborations with other UL faculty and other institutions continued to expand. Upgrading and maintaining research equipment is an ongoing process, subject to available funding.

3. Academic staff should be encouraged to publish scientific articles in high-ranking international journals.

In experts' opinion the recommendation is fulfilled. At the UL level the science excellence support program was introduced since previous Study field accreditation (2013) and the material support for a publication in the Q1 category journals (according to the WoS or Scopus database classification) was provided (SAR, Chapter 2.4.4., p.86). Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions in accordance with the Law on Higher Education Institutions (SAR, Annex 14 "List of publications and patents of teaching staff for the reporting period"; SAR, Part 2, Chapter 2.4.1., Table 11, p. 75). Approximately 50 scientific articles were published annually by academic staff

4. The exchange of students and academic staff should be encouraged at the international level.

In experts' opinion the recommendation is not fulfilled. The number of incoming foreign exchange students in the programmes of Study field has increased, but is still relatively small (SAR, Part 2, Chapter 2.5.3., p. 96; SAR, Annexes (i) Statistical data on the teaching staff and the students from abroad, (ii) Statistical data on the incoming and outgoing mobility of students, (iii) Statistical data on the incoming and outgoing mobility of the teaching staff).

5. There is an overlapping of some courses in the Bachelor's and Master's programmes. The program for Master studies should be improved (more seminars). Disputable is the principle to compress studies in 2 days weekly.

In experts' opinion the recommendation is partially fulfilled. The corresponding Master's programme courses were modified (SAR, Annexes to Master's Study Programme, Descriptions of the study courses/ modules); however, according to information received during experts' group visit (24.-25.04.2023.), Master studies are organized mainly on Fridays' and Saturdays' throughout semesters'.

6. In the final courses, students should be provided with information about potential employers.

In experts' opinion the recommendation is fulfilled. Recommendation to provide information about different companies is fulfilled by the organization of the regular annual meetings with potential employees (SAR, Annex 18). Additionally, the study course "Introduction to Studies and Research" for the first-year students was created that would allow them to meet employers (SAR, Chart 3.1.4., p.149) and meetings with employers within the study course "Innovation Processes in Chemistry" (Annex 18). High demand for graduate students in the labor market (SAR, Annexes, Analysis of the results of surveys of students, graduates and employers).

7. Secondary school programmes and teaching methodology for chemistry need to be fundamentally changed. The recommendations of graduates in didactics should be implemented, as well as the number of topics for master's theses should be increased.

In experts' opinion the recommendation is fulfilled. FC regularly cooperate in the education of chemistry teachers and the updating of secondary school chemistry content and teaching methods. Master theses in didactics are not relevant for the master's study programme as well as the education of chemistry teachers which took place at the Faculty of Pedagogy, Psychology and Arts of

the UL and is not part of this assessment.

8. Study courses should be introduced, which would include several fields of study at the same time (theory and practice), for example, physics and physico-chemical methods.

In experts' opinion the recommendation is fulfilled. Most courses in the bachelor's and master's programmes are composed of a theoretical and a practical part, especially those that are important to for the Study field and to chemistry as a discipline (SAR, Bachelor's and Master's Study programme Annexes, Descriptions of the study courses/ modules).

Recommendation to the Master's study programme "Chemistry" (45441) - year 2021

1. To prepare publicly available documentation for students, which would specify exactly the procedure by which students in block B can apply for study courses (8 CP) from other study programs in the field of natural sciences.

In experts' opinion the recommendation is fulfilled. According to information in SAR, Annex 18 and UL

home page (https://www.lu.lv/studijas/studiju-celvedis/programmu-un-kursu-katalogi/programmu-mekletajs/?tx_lustudycatalogue_pi1%5Baction%5D=detail&tx_lustudycatalogue_pi1%5Bcontroller%5D=Course&tx_lustudycatalogue_pi1%5Bprogram%5D=21202&cHash=6f6e84017db005abc9992060fd9e7d0f) application to courses of B block is possible but should be confirmed by a supervisor and programme director.

2. Revise the admission requirements, where a more appropriate definition of the required level of education would be a Bachelor's degree in chemistry and related fields.

In experts' opinion the recommendation is fulfilled. The admission requirements were revised according to the recommendations for Master Study programme from year 2021 (SAR, Annex 18) and now can be found on UL website (<https://www.lu.lv/studijas/fakultates/kimijas-fakultate/magistra-limena-studijas/kimija/>). Bachelor's degree in natural sciences or equivalent second level professional higher education (or equivalent higher education) in natural sciences, food technology, pharmacy, including qualification of a teacher of natural sciences is sufficient to enroll in Master study programme according to admission requirements (UL website, 30.05.2023.)

3. To consider the possibility of introducing a block of free choice (C) courses, in which different courses could be chosen both at the level of the entire UL and from other universities, including courses dedicated to personality development, information technology, etc.

In experts' opinion the recommendation is partially fulfilled. It is postulated that some courses of various study programs (including foreign languages) are available in accordance with the Study program plan (SAR, Annex 23M). The list of additional courses (SAR, Annex 24M) contains only three courses (Civil protection, Environment protection and Practical Latvian for International Students I) that are acquired in special cases only and aren't directly counted as C - Elective part courses. Free choice (C) courses are postulated in the programme, however, the list and the availability of the courses is not clear: no one course is mentioned in the description of Study programme (Annex 23M), Descriptions of courses of the Master's study programme (Annex 24M) or UL FC homepage (<https://www.lu.lv/en/studies/faculties/faculty-of-chemistry/graduate-studies/chemistry/>).

4. Expand the limited choice B2 block so that all sub-directions have equal choices. This is especially true for the subfield of organic chemistry, which currently offers the courses "Chemical Toxicology", "Introduction to Medicinal Chemistry" in block B2 and one of the remaining courses in part B1, all of which together do not cover the 10 CP required in part B2.

In experts' opinion the recommendation is fulfilled. In accordance with information provided by UL (SAR, Annexes 18, 23 and 24) the program has been expanded and students of all sub-directions have the equal opportunities to select courses from B2 block (SAR, Annex 23M).

5. Review the relevance of course content and titles. For example, the content of "Organic Chemistry" applied in Part A would be more in line with the title "Physical Organic Chemistry", while

the content of "Inorganic Chemistry" applied would be more in line with "Investigated Chapters of Inorganic Chemistry". On the other hand, "Biological chemistry" would be more suitable for "Natural substance chemistry".

In experts' opinion the recommendation is fulfilled. The title of "Inorganic Chemistry" course is saved but the course is moved to B2 block (SAR, Annex 23M). The content of the Organic chemistry course is not included in the Descriptions of courses of the Master's study programme "Chemistry" (SAR, Annex 24M) and cannot be analyzed;

6. Revise the content of the course "Chromatography" and prevent its overlapping with other courses, both at the Bachelor's and Master's study levels.

In experts' opinion the recommendation is fulfilled. It is postulated (SAR, Annex 18) that Chromatography courses at both the Bachelor's and Master's study levels complement each other and the course at Master's study level is a continuation of the previous Chromatography course.

7. Ensure the involvement of not only state scientific institutes, but also manufacturing companies in discussing the study program.

In experts' opinion the recommendation is fulfilled. Representatives of employers participated in the evaluation of the content of the courses and their recommendations were taken into account (SAR, Part 3, Chapter 3.2.1., p.116 and On-site visit, April 25th, 2023).

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

The provided recommendations (Joint report of experts (2011) and Recommendation to the Master's study programme "Chemistry" (45441)-year 2021) were analyzed by FC staff and the greater part of recommendations were implemented in the study courses at the Bachelor and Master's programme levels. Some problems in the implementation of the Recommendations are identified:

1. The insufficient number of the outgoing/incoming students and staff is still an actual problem, and the situation should be improved.
2. The availability and choice of the C block courses at the level of the entire UL and from other universities (including courses dedicated to personality development, information technology, etc.) is difficult to assess.

Strengths:

- 1) Transfer of FC to the new House of Nature in The Academic Centre of UL and a good level of modern equipment as well as the continuous upgrading of the equipment.
- 2) Updating the Bachelor's and Master's programmes on the basis of employers' suggestions as well as on the surveys of students and graduates.
- 3) Motivation system for the personnel to publish the results in high-ranking international journals.
- 4) Organization of the regular meetings for students with potential employers.

Weaknesses:

- 1) The low number of outgoing/incoming students and staff.
- 2) The compressed studies for MSPC students (mainly in 2 days weekly).
- 3) The lack of information about free choice courses (C block).

Assessment of the requirement [4]

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

Assessment of compliance: Fully compliant

The provided recommendations (Joint report of experts (2011)) as well as Recommendation to the Master's study program (2021) were analyzed by FC staff and the greater part of recommendations were implemented in the study courses at the Bachelor and Master's programme levels (SAR pp. 98-101; Annexes 18, 23 and 24).

The weaknesses identified during the evaluation of the implementation of the Recommendations (2013 and 2021) have limited impact on the study's quality or can be explained by objective reasons such as COVID -19 pandemic.

1.7. Recommendations for the Study Field

Short-term recommendations

The Development plan of the Study Field should be further developed to include educational opportunities for adults and life-long education and the implementation of balanced research and pedagogical activities (by the 2024/2025 academic year).

MSPC admission requirements should be reconsidered and developed (by the 2024/2025 academic year).

Compressed study at MSPC should be evenly distributed throughout the work week (by the 2023/2024 academic year).

Long-term recommendations

Lifelong learning programmes on various topics related to the Study Field should be developed (by next accreditation).

Additional measures to reduce the dropout rate for both study programmes should be developed and validated (till next accreditation).

Mobility of students and teaching staff, both incoming and outgoing is low and should be further developed and encouraged (till next accreditation).

II - "Chemistry" ASSESSMENT

II - "Chemistry" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

In the scope of Academic Bachelor study programme "Chemistry" 43441 students get introduced with basic areas of chemistry. Study course descriptions (SAR, Annex 24_B Description of study courses). Also study programme code belongs to the educational programmes - chemistry Cabinet of Ministers regulations No.322 "Latvian education classification". According to the experts, such a goal is fully aligned with study field chemistry, chemistry technologies and biotechnology, therefore the study programme complies with the study field.

2.1.2.

Academic bachelor's study programme "Chemistry" 43441 is only a full time study programme implemented in Latvian language. Degree to be obtained after 3-year (6 semesters) studies is - Bachelor's degree of Natural Science in Chemistry, covering 120 Credit points (CP) equivalent to 180

ECTS. Since this is an academic study programme there is no qualification to be obtained. Study programme goal is to provide students with theoretical knowledge and research skills in the basic areas of chemistry, thus preparing chemistry specialists for various sectors in the industry. This goal can be achieved with the tasks set by the study programme (SAR, Part 3, pp. 139-141). During the study period students can obtain theoretical knowledge and skills in the basic areas of chemistry, can learn practical and research skills in laboratories and learn how to cooperate not only locally but internationally, and understand professional ethics (SAR, Part 3, pp. 139-141; SAR Annex 24_B Description of study courses). By learning and fulfilling these tasks students can obtain study programme results. Regarding knowledge to demonstrate basic and specialized knowledge of inorganic, organic, physical, analytical and biological chemistry. They have learned skills to apply theoretical knowledge in practical research activities and present their own results. Since this is an academic study programme, closely related to research activities, students also can select and evaluate scientific information, solve problems in the field of chemistry and make decisions based on scientific research. To enroll in the study programme requirement is Secondary education (SAR, Part 3, pp. 139-141). Study programme goals, tasks and results are interrelated and justified. Enrolment criteria is also appropriate for this study programme.

According to the experts, full time study programme duration of 3 years (6 semesters, equivalent of 120 CP or 180 ECTS) is sufficient and appropriate to meet study programme goals and learning outcomes. Study programme is being implemented only in Latvian language, and since enrollment criteria does not include English language and all of staff members are proficient in Latvian language study programme implementation is also reasonable and justified.

2.1.3.

Within the previous reporting period the study programme has undergone only minor changes which are mentioned in SAR (Part 3, Chapter, 3.1.1., p. 142). Compulsory part of programme was reduced by 4 CP. Optimization of study courses allowed to reduce 2 more CP, which were substituted with courses that can train student soft skills and be beneficial for the labor market - Course project and Chromatography Methods. Reduced 4 CP from mandatory courses were transferred to the restricted elective part, which was supplemented with new study courses created in collaboration with employers. According to the experts, such changes are appropriate and ensure that the study programme stays relevant and develops to provide students with necessary knowledge to enter the labor market after graduation.

2.1.4.

Study programme is related to STEM subjects. Latvian National Development Plan 2021-2027, has set goal to increase science field graduates from 6,8% to 12%. (SAR, Part 3, Chapter 3.1.3., p. 146). This study programme is providing specialists in chemical science and therefore can help achieve this goal. Besides this, during the site visit graduates, employers confirmed that there are no problems to enter labor market after graduation. Employer surveys Annex 8. even indicate that graduates are at high demand in the labor market. Students during the interviews also confirmed that in most of the cases from 2nd study year they already are part time employed in some institution, company or project. Chemistry specialists are needed in different field such as food industry, pharmaceuticals, forestry, environmental science etc. (SAR, Part 3, Chapter 3.1.3., p. 147) Taking this into account there still is long term future perspective and room for this study field graduates in the labor market. Study programme graduates also have high employment rate. (SAR, Part 3, Chapter 3.1.3., p. 147) Since 2017 there has not been graduation year that would have less than 85% employment in the field of chemistry. This is also indicator for the need of chemistry specialists in the labor market. Each year enrolled student amount is fluctuating, but on average there are approximately 60 students enrolled each year (SAR, Part 3, Chapter 3.1.4., p. 148). On the other side overall student count in the study programme is slowly declining from 186 students in

total in 2013 to 151 students in 2022. This is also connected to high drop out rates of students, during last 8 years, each academic year more than 30 students have been exmatriculated (SAR, Annex 21_B_Statistics on students during the review period). As the most common reason for abandoning studies students identified loss of interest in the programme and difficulties with the higher mathematics, confirmed during the site visit from student and staff representatives as well (SAR, Annex 21_B_Statistics on students during the review period). According to the experts, overall study programme graduates are highly demanded in the field and study programme plays important role to fill these vacancies in Latvia.

2.1.5. Not applicable.

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

Study programme complies with the study field. Aims, objectives, learning outcomes and admission requirements are interrelated and logically connected. Study programme syllabus leads to achievement of learning outcomes. The corrections made to the study programme's parameters within the assessment of the study field were only minor and were analyzed and are appropriate to ensure development of the study programme. Although student count is slowly decreasing over the years, study programme is economically justified and chemistry graduates are need for the labor market.

Strengths:

1) High demand of graduates in the labor market.

Weaknesses:

1) High dropout rate of students.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Academic bachelor's study programme "Chemistry" (43441) is developed on the basis of the Law of the Republic of Latvia on Higher Education Institutions and Cabinet of Ministers Regulations No. 240 (13.05.2014) "Regulations on the State Standard of Academic Education". The distribution of credit points for the programme (120 CP) and the duration of full-time studies (six semesters) correspond to the requirements for academic study programmes of the National Standard for Academic Education (SAR, Annexes, Compliance with the study programme with the State Education Standard, p. 150). The core requirements of the "Chemistry Eurobachelor" were taken into account during designing the compulsory part (part A) of the study programme. The total volume of basic courses (66 CP/99 ECTS, SAR, Part 3, Chapter 3.2.1., pp. 152-153) (general chemistry, analytical, inorganic, organic, physical, and biological chemistry as well as physics and mathematics) is similar to the requirements of the "Chemistry Eurobachelor" (at least 90 ECTS).

The content of the compulsory study courses is often divided in a few parts: the basic principles and theoretical aspects of the field in the first part then students deepen their knowledge and learn the practical application of the methods in the following courses (SAR, Part 3, Chapter 3.2.1., p. 152). This approach should ensure the achievement of learning outcomes.

Restricted elective courses (part B) allow to receive in depth knowledge in one of the sub-disciplines - analytical chemistry, organic chemistry, or physical chemistry. These sub-disciplines are in line with the sub-disciplines of the Master's programme and tightly connected with the main research areas of the FC. The compulsory study courses and restricted elective courses are interconnected

and complementary. The development of 5 completely new restricted elective study courses was provided in coordination with employers and graduates (SAR, Part 3, Chapter 3.2.1., p. 154). In coordination with employers the volume of the research project was changed from 2 CP to 4 CP that can provide students with a variety of practical skills and improve their labor-market positioning.

According to the report (SAR, Part 3, Chapter 3.2.1., p. 156) the content of study courses was regularly revised corresponding to the latest scientific trends in chemistry. It is postulated that the frequency of a course description updating varies, being more frequent for Part B study courses than for Part A courses (SAR, Part 3, Chapter 3.2.1., p. 157). BSCP complies with the State Education Standard (SAR; Annexes, Compliance with the study programme with the State Education Standard). In experts' opinion the Bachelor study programme complies with Cabinet of Ministers Regulations No. 240, Riga, 13 May 2014 (Minutes No. 28, §18), <https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitiba-standartu>; (only in Latvian). Total amount of CP in Study programme is 120 CP, length of implementation - 3 years, CP are divided as follows: 82 CP in total compulsory part (the Bachelor's thesis, which is the main final component of the compulsory part counts for 10 CP), 26 CP in total restricted elective part, and 2 CP in total elective course part. Environment Protection with 1 CP and Civil protection with 1 CP are included in the list of compulsory courses (SAR, Anex 23B). Based on the information provided by HEI, experts find that other requirements specified in the regulations are also met (SAR, Annex_22B).

2.2.2. Not applicable.

2.2.3.

The Bachelor's study implementation includes a variety of knowledge acquisition and consolidation methods such as the different types of lectures (introductory, interactive, and problem-oriented), assignments, seminars, individual and group work as well as laboratory work. The volume of laboratory work is declared as almost half of the contact hours of the programme (SAR, Part 3, Chapter 3.2.1., p. 151; SAR, Part 3, Chapter 3.2.3., p. 158) that can raise a question about the distribution of the contact hours between other parts of the study process: theoretical (lectures) and practical (seminars). This approach can affect the understanding of basic principles and theoretical aspects that are the important achievements of the course (SAR, Annexes, Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme). Students' achievements are assessed at two levels: (a) qualitative assessment - (grade on the 10-point scale); (b) quantitative assessment - number of credit points (SAR, Part 3, Chapter 3.2.3., p. 159).

A few approaches are used to realize the student-centered learning: the teaching staff and students discuss the content of studies and methods of organization; the results of student surveys are considered for the improvement of the study process as well as students are engaged in academic research initiated by the academic staff. In the first year the study course "Introduction to Studies and Research" is offered to students that allow them to get acquainted with the study environment. Students receive support and feedback from the lecturers during the study process and all students are provided with the consultations with the lecturer face-to-face to discuss any unclear issues. Different IT tools such as the Moodle system and Microsoft Teams platform were used in the realization of remote studies (SAR, Part 2, Chapter 2.5.1., p. 90), the use of e-learning also enables collaboration with students and lecturers (SAR, Part 3, Chapter 3.2.3., p. 159).

To reduce the high drop-out rate mentors and curators have worked with students, as well 'study groups' were set up (SAR, Part 3, Chapter 3.1.4., p. 149). According to the student's survey data (SAR, Annexes, Analysis of the results of surveys of students, graduates and employers, Tables 2 and 3), independent work outside the studies (for a longer time than 15 hours per week) is necessary in the case of approximately 60% of students. At the same time more than 70% of students have declared full/part time employment. It can be supposed that the increasing of class

contact hours can decrease the volume of independent work outside the studies and, probably, the drop-out rate.

Psychological support is provided by the Study Service Department for solving both personal and study issues (SAR, Part 2, Chapter 2.3.8., p. 69).

In experts' opinion, the study implementation methods contribute to the achievement of the aims and learning outcomes of the study courses and the study programme.

2.2.4. Not applicable.

2.2.5. Not applicable.

2.2.6.

The choice of the topics for the Bachelor's theses is made on an individual basis in consultation with the academic staff of the faculty. A large part of students choose the topic of their research work in the 5th semester in the study course "research project". However, many students start working in one of the laboratories in the 1st semester of studies, both at the UL and at scientific institutes (OSI, ISSP, ICP, etc.) (on-site interviews with students, April 24th and 25th, 2023).

During the reporting period (from the academic year 2013/2014 to the academic year 2020/2021), the graduates of the study programme have developed 286 bachelor theses in the research areas of the Faculty of Chemistry. Bachelor theses have been developed both at the FC of the UL and at other faculties and scientific institutes of the UL: the Institute of Organic Synthesis, the Institute of Wood Chemistry, production enterprises of a/s "Grindeks", a/s "Olainfarm" and other institutions, which are often the future workplaces of the graduates of the Bachelor programme. The areas of research topics include Chemistry and nanotechnology, Development of innovative functionalized or chemically modified materials, Development of new analytical research methods, Nanomaterials for energy and sensor, Radiation chemistry and radiochemistry and finally Organic synthesis and research in the field of medicine and life sciences, where bachelor theses are developed mainly at the Faculty of Chemistry and the OSI (SAR, Part 3, Chapter 3.2.6., pp. 160-162).

During the on-site interview with students the issue with writing theses in Latvian only was raised, students stated that English language would be preferable for them and that would also internationalize their work. Finally, the theses are not publicly available.

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

Academic Bachelor's study programme "Chemistry" complies with national regulation. Courses of the programme are interconnected, complementary and give the opportunity to achieve the learning outcomes. The student-centered learning approach is used in the implementation of the programme. The topics of the students' theses follow the main sub-directions of FC and correspond to the programme.

Strengths:

- 1) Organization of the study environment and use of the student-centered learning approach.
- 2) Coordination with employers in the revision and updating of the courses.
- 3) Use of the different IT tools in the study process.

Weaknesses:

- 1) E-repository of thesis is not public.
- 2) The lack of the analysis of the combined workload of the students (especially for the first year students).

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

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

Assessment of compliance: Not relevant

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2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The UL has a modern material and technical base, which provides a high-quality advanced learning environment. Facilities and laboratory equipment of the Centre of Natural Sciences offer a wide range of research and learning opportunities for students. The total area of the Faculty of Chemistry is 1900 square meters, of which the teaching/learning and scientific laboratories occupy 1220 square meters. The student teaching/learning laboratories are equipped 164 with modern teaching equipment, including analytical balances, rotary evaporators, pH meters, TitraLab880 and Karl Fisher titrators, thermostats, UV-ViS spectrometer, IR spectrometer, air analysers (ozone analyser, NOx analyser, aerosol particle analyser) as well as various types of gas and liquid chromatographs and AutoLab potentiostats (SAR, Part 3, Chapter 3.3.1., p. 163).

Chemistry students use the research infrastructure available at the FC, including a high performance liquid chromatograph/mass spectrometer with a TOF detector (Agilent Technologies), inductively coupled plasma triple quadrupole mass spectrometer ICP-QQQ, differential scanning calorimeter, nuclear magnetic resonance spectrometer, isotope ratio elemental analyser, S8 Advanced and S8 Tiger powder X-ray diffractometers, thermogravimeter, Aminco Bowman AB-2 fluorescence spectrometer for laboratory work and especially for research (research project, bachelor's thesis). Students of the study programme also have access to the extensive resources of the UL Science Library in Latvian, English and other languages.

The study courses in the study programme are created in the e-studijas.lu.lv Moodle environment. Materials necessary for studies, as well as instructions for successful course acquisition are regularly placed there; it is also the place for daily communication between students and the teaching staff. Interim tests and exams are created on e-studijas.lu.lv, as well as midterm grades are recorded and the final course grade is calculated. By logging in with the student profile details, students can keep track of their progress and the topical information (SAR, Part 3, Chapter 3.3.1., p. 164).

The Faculty of chemistry has large and well equipped laboratories (visit on site April 24). Each of the learning/ teaching laboratories has eight to ten workstations. Laboratories have different kinds of equipment levels, but all instruments are in good condition.

The Natural Sciences Library has a spacious room for each student and for groups to study and do group work (site visit April 24). Each student can use the library 24 hours a day. As described in the chapter 1.3. Resources and Provision of the Study Field, UL staff and students have the opportunity to use the following in the library: free access to the collection, self-service facility for home delivery of books, renewal and check-out, computers, cell phone charging. All laptops available in the library are equipped with licensed software needed for the requirements of the study programme. The total number of new titles added to the UL Library was 617 in Chemistry, of which 305 titles are available in the Natural Sciences Library. The print collection includes books, serials, journals, dissertations, and abstracts in Latvian, English, German, and Russian. Currently, the e-resource repository contains more than 5712 publications in the field of study "Chemistry, chemical technology and biotechnology". In 2021, the UL provides access to 42 e-resource platforms (e-book platforms, e-

journal databases and individual subscribed e-journals, reference resources and tools, mixed format databases). In total, there are 17,477 full-text e-journals (including individual subscribed e-journals), 205,306 e-books, nearly 5 million full-text and abstracts of doctoral and master's theses from around the world available through subscriptions. The UL also provides links to 174 credible open access databases of multi-format materials (SAR, Part 2, Chapter 2.3.3., pp. 52-53).

The UL Library regularly provides trial access to various databases, averaging 10-15 per year (SAR, Part 2, Chapter 2.3.3., p. 54).

The library's collection in general corresponds to the implementation of studies and the development of research, as its stocks are supplemented each year with the latest information resources according to the information needs of academic staff and students (SAR, Part 2, Chapter 2.3.3., p. 56).

According to the experts, the library is adequately equipped and fully meets the requirements associated with the implementation of the study programme.

2.3.2. Not applicable.

2.3.3.

To ensure the necessary funds for the implementation of the BSP "Chemistry", the University of Latvia uses a state budget grant from the Ministry of Education and Science or tuition fee.

The cost of study programmes at the University of Latvia is calculated according to the methodology developed by the UL. It takes into account the costs of study process support and information about the plan of the study programme, the involved teaching staff, the planned number of students, and other aspects, thus ensuring the reliability of the forecasts (SAR, Part 3, Chapter 3.3.3., pp. 165).

The main part consists of teaching staff costs (about 50 percent), general staff costs (about 8 percent) and indirect costs (On site interview with dean April 24).

In order for the programme to be profitable and provide students with a high-quality study process, the number of students in the programme paid for by the state budget must be at least 156 (SAR, Part 3, Chapter 3.3.3., pp. 166-167). In the 2021/2022 academic year, there were 175 students at FC, of which 158 were state-funded and 17 were tuition-paying students. Thus, there was a small surplus of revenue. Taking into account the above and according to the experts, FC has sufficient funds for the implementation of the bachelor's programme, with minor funds still accumulating that can be used for minor activities related to the further development of the study programme (e.g., the purchase of less laboratory equipment for the needs of student exercises).

Increasing the number of students and/or tuition fees could be necessary to increase the cost effectiveness of the study programme. In addition, the development of the study programme can be financed from the revenues received from different FC services, as well as from the financial resources accumulated by the structural unit. Faculties also receive financial support for the development of programmes from the UL Study Quality Improvement Fund (SAR, Part 3, Chapter 3.3.3., p. 167).

According to an on site interview on April 24, 2023 the UL calculated these expenses according to yearly revenues. They are applying to internal and external projects with co-financings, so teaching staff and students can receive financing support.

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

UL has a strong provision of resources: fully purchased equipment park. The equipment and apparatus are fully available for research works and for student teaching. The library has wide, open space, where to study and use all accessible resources. UL full-fledged use e-study environment Moodle. The study programme is fully funded from the state budget and from the revenues of the various services of FC. Financial support for programme development is provided by the UL Study

Quality Improvement Fund.

Strengths:

1) Fully equipped laboratories with all necessary materials and modern equipment for teaching and research.

Weaknesses:

1) Increasing the number of students and/or tuition fees could be necessary to increase the cost effectiveness of the study programme.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The UL has a modern material and technical base, which provides a high-quality advanced learning environment. Facilities and laboratory equipment of the Centre of Natural Sciences offer a wide range of research and learning opportunities for students (SAR, Part 3, Chapter 3.3.1., p. 163). The library is adequately equipped and fully meets the requirements associated with the implementation of the study programme (SAR, Part 2, Chapter 2.3.3., pp. 51-56).

2.4. Teaching Staff

Analysis

2.4.1.

Academic staff from different UL institutions (FC, Faculty of Geography and Earth Science, Faculty of Biology, Faculty of Physics, Mathematics and Optometry) have been involved in the implementation of the BSPC in the academic year 2021/2022. In addition to 34 academic staff members, including 4 professors, 10 associate professors, 9 assistant professors, 2 lecturers, 7 researchers, and 2 research assistants, other members of the academic staff were also involved in the implementation of the study program, serving as thesis supervisors. In the documents prepared for accreditation describing the implementation of the study program in the academic year 2023/2024, a slightly different structure and number of teaching staff are foreseen, so that the implementation of the study program will include 7 professors, 9 associate professors, 7 assistant professors, 8 lecturers and 4 researchers. One of the professors who will be involved in the implementation of the BSPC is a visiting professor from Vinlinus College University, so 97% of the teaching staff from UL will be involved in the implementation of the study program (SAR, Part 2, Chapter 3.4.1., pp. 167-168; SAR, BSPC Programme Annexes, Descriptions of the study courses/modules). Consequently, the number of professors and associate professors (16 in total) complies with Article 55.1.3. of the Law on Higher Education Institutions which defines the number of professors and associate professors involved in the implementation of the compulsory and restrictive elective parts of the study programme (SAR, BSPC Programme Annexes, Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions; SAR, BSPC Programme Annexes, 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). Additionally, according to the available information, 73 % of the staff members have a PhD (SAR, Part 3, Chapter 3.4.1., p. 169).

According to the experts, the teaching staff is highly qualified and their research activities fully

cover the areas they teach in the BSPC. Academic staff members are leading researchers and specialists in different fields of chemistry (analytical chemistry, physical chemistry, inorganic chemistry, organic chemistry) as well as in other natural sciences (physics, mathematics, biology) which enables the execution of the BSPC in accordance with the highest possible standards of the profession and provides the necessary prerequisites for acquiring the intended learning outcomes of the study program. For example, one of the professors of "Analytical Chemistry" is a member of the Latvian Academy of Sciences, while another professor, who is also involved in teaching the same course, is a leading national expert in the field of analytical chemistry. The professor of "Nanochemistry" is a leading expert in the field of nanochemistry and the leader of numerous projects, while an assistant professor who teaches course "Macromolecules" focuses on the research of polymeric materials (SAR, Part 3, Chapter 3.4.1., p. 168; SAR, BSPC Programme Annexes, Descriptions of the study courses/modules; SAR, Annexes, Biographies of the teaching staff members).

As a strength of the study program, the involvement of several professors and other academic staff members in the implementation of individual courses should be highlighted. For example, four academic staff members are involved in the implementation of the course "Organic Chemistry", where the assistant professor is responsible for conducting lectures and seminars, while second assistant professor, lecturer and PhD student are responsible for conducting exercises. The same is for other courses, which ultimately ensures smooth delivery of courses even in the case of absence of part of the academic staff involved in the implementation of courses (SAR, Part 3, Chapter 3.4.1., pp. 167-168; SAR, BSPC Programme Annexes, Descriptions of the study courses/modules).

Knowledge of the Latvian and English languages of all members of the academic staff is in accordance with the requirements prescribed by the Law on Higher Education (SAR, Annexes, 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.; SAR, Annexes, 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).

The age structure of assistant professors, researchers and research assistants should be highlighted, which includes a large number of young employees of the FC, which will in the future ensure a simple and effective takeover of teaching duties from more experienced teachers upon their retirement (SAR, Part 3, Chapter 3.4.1., p. 169).

2.4.2.

The changes in the composition of the academic staff that were involved during the accreditation period did not have a negative impact on the implementation of the BSPC and the compliance of the BSPC with the requirements specified in regulatory enactments, quite the opposite.

First of all, it should be pointed out that all teachers involved in the execution of the study program were elected to academic positions. In addition, the qualifications and number of teachers involved in the implementation of the study program have increased significantly. Thus, in the period since the previous accreditation, 11 teachers (7 from FC and 4 from other UL institutions) who are no longer involved in the execution of the study program were replaced by 14 new teachers. In addition, 9 teachers advanced to higher positions, and all of these teachers, without exception, are well-known in their scientific field, which is evident from their publications and participation in various projects (SAR, Part 3, Chapter 3.4.2., p. 169; SAR, Annexes, Biographies of the teaching staff members).

As for the teachers from other UL institutions involved in the implementation of the BSPC, their number has not changed, but there has been a generational change and now new, qualified

teachers are involved in the implementation of the study program. The same applies to teachers of other, new subjects that are involved in the implementation of the study programme, for example those in the field of social sciences and humanities (SAR, Part 3, Chapter 3.4.2., p. 169; SAR, Annexes, Biographies of the teaching staff members).

2.4.3. Not applicable.

2.4.4.

Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions in accordance with the Law on Higher Education Institutions. A list of scientific publications (indexed in Scopus or WoS) relevant to the research areas pursued by the academic staff and students of Faculty of Chemistry in the period 2016-2021 is available in Annex 14 "List of publications and patents of teaching staff for the reporting period". The number of publications, patents and conference abstracts is summarized in Table 11 (SAR, Part 2, Chapter 2.4.1., p. 75).

2.4.5.

Mechanisms that ensure changes and improvements to the study program for the purpose of better interconnection of different study courses have been established. Proposals related to this are discussed and considered at the Board of Study Programs meetings and at the Study Field Council meetings, taking into account, in addition to current scientific trends, student proposals collected in the framework of various surveys that are periodically carried out according to the established procedures that regulate this quality assurance area (SAR, Part 3, Chapter 3.4.5., p. 171).

In addition, the cooperation of the teaching staff on issues related to the implementation of the study program is ensured by holding various meetings and/or by communication via e-mail organized by the FC and BSPC management. Depending on the topics, if necessary, individual meetings with the teaching staff, as well as group meetings at the chairs, are organized (SAR, Part 3, Chapter 3.4.5., p. 171).

The teaching in most study courses is organized in such a way that a larger number of teachers participate in it, regular mutual cooperation of the teachers involved is necessary to ensure effective teaching process. This is done, for example, in such a way that one of the teachers is responsible for content changes in the LUIS system, another for the distribution and coordination of activities between the involved teachers, the third for other administrative issues related to teaching process, etc (SAR, Part 3, Chapter 3.4.5., p. 171).

Chemistry is a scientific discipline that includes various interrelated courses, therefore it is necessary to conduct the study courses included in the study program in such a way that they complement and include each other. This was done not only through the prerequisites for joining a particular BSPC courses (SAR, BSPC Programme Annexes, Descriptions of the study courses/modules), but also through the fact that, for example, a product obtained by synthesis within the scope of laboratory work in the course "Organic Chemistry" can be analyzed within the scope of the course "Analytical Chemistry", and after isolation, the product obtained in the form of a crystals can be further analyzed in as part of the laboratory work carried out in the course "Physical Chemistry". In this way, the mutual connection of the teachers participating in the implementation of the study program in the framework of different courses is ensured (SAR, Part 3, Chapter 3.4.5., p. 171; SAR, BSPC Programme Annexes, Descriptions of the study courses/modules).

The small student/teacher ratio (5.1 students per teacher in academic year 2021/2022,) should be highlighted as one of the great advantages of BSPC. The above enables the teacher to effectively and often on an individual basis transfer the competences, knowledge and skills necessary for the acquisition of the planned learning outcomes (SAR, Part 3, Chapter 3.4.5., p. 171).

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

The qualifications of the teaching staff involved in the implementation of the study programme meet the requirements for the implementation of the study programme and enable the achievement of the objectives and learning outcomes of the study programme and the corresponding study courses. The changes in the composition of the teaching staff do not negatively affect the implementation of the BSPC and the BSPC's compliance with the requirements set forth in the legal regulations, quite the contrary. Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions in accordance with the Law on Higher Education Institutions. Mechanisms to ensure changes and improvements in the study programme for the purpose of better linking the different study courses have been established and are effectively applied, ensuring the achievement of the study programme objectives and the adoption of learning outcomes.

Strengths:

- 1) The teaching staff is highly qualified and their research activities fully cover the areas they teach.
- 2) The involvement of several professors and other academic staff in the delivery of most of the individual courses.
- 3) The small student to teacher ratio.

Weaknesses:

- 1) The participation of visiting professors and scientists in the implementation of the study program is negligible.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff and visiting professors, associate visiting professors, visiting docents, visiting lecturers and visiting assistants is in compliance with the conditions for the implementation of the study program and the requirements set forth in the respective legislation. Just one of the professors involved in the implementation of the BSPC will be a visiting professor from Vinlinus College University, so 97% of the teaching staff from UL will be involved in the implementation of the study program (SAR, Part 2, Chapter 3.4.1., pp. 167-168; SAR, BSPC Programme Annexes, Descriptions of the study courses/modules).

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

According to information provided in the Annex 22B of SAR, the Bachelor's study programme "Chemistry" is fully compliant to the State Education Standard.

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

SAR contains the description of the requirements for the study courses and study materials such as requirements starting a study course, the purpose of the study course implementation, the planned study results, the content of the study course, mandatory literature and supplementary literature (Annex 24B), the evaluation criteria of study results that complies Law on Higher Education Institutions (Augstskolu likums (likumi.lv)).

The descriptions of the study courses and the study materials have been prepared in Latvian and additionally (for the part of courses) in English (SAR, Annex 24B).

In general, literature included in the course descriptions is up-to-date and provides the combination of Compulsory Reading List (both in English and Latvian), Further Reading List and Periodicals/Other Sources. Most of the recommended/provided sources of information are in English (SAR, Annex 24B).

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

Assessment of compliance: Fully compliant

The sample of the diploma to be issued with additional information on the national higher education system is provided (SAR, Annex 19B).

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

Assessment of compliance: Fully compliant

According to the Law on Higher Education Institutions at least five professors and associate professors should be among the teaching staff members (Augstskolu likums (likumi.lv)). The academic staff of the Bachelor's study programme fully complies with the requirement (SAR, Annexes 10 and 24B).

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The Head of study field certified the Latvian language proficiency of the academic staff involved in the implementation of the study programme "Chemistry" (code 43441) (SAR, Annex 11) according to the State Regulation (<https://likumi.lv/ta/id/330669-noteikumi-par-valsts-valodas-zinasanu-apjomu-valsts-valodas-prasmes-parbaudes-kartibu-un-valsts-nodevu-par-valsts-valodas-prasmes-parbaudi>).

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Annex 7 contains the agreement form for studies at the University of Latvia in the selected programme, according to the requirements of the programme and the normative rules of the UL related to the study process.

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

Assessment of compliance: Fully compliant

The agreement between the UL and Riga Technical university confirms the opportunities for continuation of studies in the study programme of the Bachelor's degree programme "Chemistry and Chemical Technology" (43528) of RTU study field "Chemistry, Chemical Technology and Biotechnology" if the implementation of the UL study programme is terminated (SAR, Annex 5).

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

Assessment of compliance: Fully compliant

Refund and Compensation Policy is declared in the Statement (SAR, Annex 6A) and follows the Cabinet of Ministers Regulation No. 795 "Regulations Regarding Licensing of Study Programmes".

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments: According to experts, programme compliance to State academic Education Standard, complies to Regulations of Cabinet of Ministers No. 202."Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinošus dokumentus", Section 55, paragraph 1, Clause 3 of the Law on Higher Education Institutions of the Republic of Latvia.

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

The study programme is characterized by numerous advantages in its implementation, which distinguish it from similar study programmes, and which should be emphasized. First of all, highly qualified and motivated teaching staff, whose research activities fully cover the areas of the study programme. In addition, the involvement of several professors and other academic staff in the implementation of most of the individual courses, which allows the smooth implementation of the study program even in the absence of part of the academic staff (which in turn allows the mobility of academic staff which should be used in the future). The low student-to-teacher ratio ensures the full commitment of the teaching staff to the students, which is one of the necessary conditions for the effective transfer of competences, knowledge and skills and the acquisition of the planned learning outcomes. Consequently, this facilitates the organization of the study environment and the application of the student-centered learning approach. In addition, coordination with employers in revising the study program and updating the courses should be highlighted as a positive side of the development of the study program.

The main disadvantages of the study program are the high dropout rate and the insufficient participation of visiting professors and researchers in the implementation of the study programme. In addition, e-repository of the thesis is not publicly available, making it impossible to access one of the fundamental outcomes of higher education at a public institution. There is also a lack of analysis of the combined student workload (especially for first year students). Additional analysis of study costs should be considered in order to set the tuition fees appropriately, which can be achieved by increasing the number of enrolled students.

Evaluation of the study programme "Chemistry"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Chemistry"

Short-term recommendations

Analysis of study costs should be considered in order to set the tuition fees appropriately (till academic year 2024/2025).

Analysis of the combined student workload should be conducted (till next academic year).

Long-term recommendations

The drop-out rate should be decreased and additional measures for it should be developed (until the next accreditation).

Additional measures should be developed to attract a greater number of candidates from the country who will enroll in the study programme (within 3 years).

The number of visiting professors and researchers involved in the implementation of the study programme should be increased (until the next accreditation).

The e-repository of the thesis should be publicly available (within 3 years).

II - "Chemistry" ASSESSMENT

II - "Chemistry" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

In the scope of Academic Masters study programme "Chemistry" 45441 students get introduced with modern in-depth knowledge of chemistry Study course descriptions (SAR, Annex 24_M Description of study courses). Also study programme code belongs to the educational programmes - chemistry Cabinet of Ministers regulations No.322 "Latvian education classification". Such goal is fully aligned with study field chemistry, chemistry technologies and biotechnology, therefore study programme complies with the study field.

2.1.2.

Academic Masters study programme "Chemistry" 45441 is a full time study programme implemented in Latvian language and from next academic year also available in English language. Degree to be obtained after 2-year (4 semesters) studies is - Masters degree of Natural Science in Chemistry, covering 80 Credit points (CP) equivalent to 120 ECTS. Since this is an academic study programme there is no qualification to be obtained (SAR, Part 3, pp. 103-105). Study programme goal is to provide students with sophisticated theoretical knowledge and research skills in the areas of chemistry and one sub-discipline. This goal can be achieved with the tasks set by the study programme (SAR, Part 3, pp. 103-105). During the study period students can obtain sophisticated theoretical knowledge and skills in different areas of chemistry, can further develop practical and research skills in laboratories to carry out research activities and learn how to cooperate not only locally but internationally, and understand professional ethics to continue developing soft skills compared to bachelor's level. (SAR, Annex 24_M Description of study courses) Additionally students have to learn and demonstrate in-depth knowledge in one of chemistry sub-disciplines (analytical, physical or biomolecular and organic chemistry). By learning and fulfilling these tasks students can obtain study programme results. Regarding knowledge to demonstrate profound and extended knowledge chemistry and its sub-disciplines. They have learned skills to independently apply theoretical knowledge in practical research activities and present their obtained results. Additionally students have to be able to carry out research under unpredictable conditions, to independently develop self-competencies. To enroll in the study programme requirement is Bachelor's degree or second level professional higher education (or education equal to it) in chemistry, chemical technology, material sciences, natural sciences, pharmacy and food technology. For the English study programme requirements of English knowledge of B2 level are added additionally (SAR, Part 3,

pp. 103-105). Both study programme implementation languages are reasonable and usage of English is justified. Students have access to library materials in English language, most of the scientific work is being carried out in English language and all staff members have at least B2 level English language knowledge to teach students. Annex 12 "Certificate of lecturers' knowledge of English" Experts suggest revising admission criteria and additionally for example allow to enter also with bachelor's degree in the field of biotechnology. Overall experts team conclude that study programme duration is reasonable and enables students to fulfil study programme goals and meet learning outcomes for both implementation languages. 2 year (4 semesters) duration is reasonable and justified with study programme syllabus. Study programme goals, tasks and results are interrelated and justified. Enrolment criteria is also appropriate for this study programme.

2.1.3.

During the reporting period Masters study programme has undergone significant changes in the syllabus and the overall approach of subdivision specializations. First of all, opportunity to specialize in sub directions has been reduced to only Analytical, Physical and Organic chemistry, because previously available options are no longer classified as sub-disciplines of chemistry. (SAR, Part 3, Chapter 3.1.1., p. 106) Compulsory part has been extended by 6 CP, to improve and modernize study courses. And also inclusion of new study courses in total worth of 12 CP, to diverse students ability to choose in optional part of the study programme. Free choice study course of 2 CP has been introduced into the study programme. (SAR, Part 3, Chapter 3.1.1. table 4.1.) Also adding English flow of students in study programme has been planned and is set for the next academic year, to promote internationalization and attract more international students and experts. All of the changes have been discussed with employers and academic staff, also confirmed during the site visit. All changes implemented in the study programme were planned and discussed with involved stakeholders. Renewed study programme has achieved the goal to optimize and modernize the study programme syllabus.

2.1.4.

Study programme is related to STEM subjects. Latvian National Development Plan 2021-2027, has set a goal to increase science field graduates from 6,8% to 12%. This study programme is providing specialists in science and therefore can help achieve this goal. (SAR, Part 3, Chapter 3.1.3., p. 146). Besides this during the site visit graduates, employers confirmed that there are no problems entering the labor market after graduation. Students during the interviews also confirmed that in most of the cases they already are part time/full time employed. Chemistry specialists are needed in different fields such as food industry, pharmaceuticals, forestry, environmental science etc. (SAR, Part 3, Chapter 3.1.3., p. 112) Taking this into account there still is perspective and room for this study field graduates in the labor market, especially after obtaining a Masters degree. Study programme graduates, students and employers confirmed that there are no issues to find a job after graduation. This is also an indicator for the need of chemistry specialists in the labor market. Each year the enrolled student amount in the study programme is slowly declining from 50 students in total in 2013 to 35 students in 2022. Also the total student amount in the study programme is declining throughout all the reporting period. From 103 students in 2013 down to 58 (SAR, Annex 21_M_Statistics on students in the reporting period). This is also connected to high drop out rates of students. On average each academic year more than 10 students are being exmatriculated from Master level study programme based on inability to fulfill their obligations in a timely manner (SAR, Annex 21_M_Statistics on students in the reporting period). Decrease in the student amount is also tied to Bachelors study programme graduate amount, which has been described under Bachelors level study programme. Based on graduate surveys 93% of students have worked in the industry and 30 out of 31 has indicated that education has helped to find a job (SAR, Part 3, Chapter 3.1.3., p. 112). Overall study programme graduates are highly demanded in the field and study

programme plays important role to fill these vacancies in Latvia.

2.1.5. Not applicable.

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

Study programme complies with the study field. Aims, objectives, learning outcomes are interrelated and logically connected. Admission requirements are appropriate and reasonable, but the experts team concluded that enrollment criteria can be expanded, for example for biochemistry Bachelor level students. Study programme syllabus leads to achievement of learning outcomes. The corrections made to the study programme's parameters within the assessment of the study field were significant but all of the changes were analyzed and are appropriate to ensure development of the study programme. Study programme is also planned to be implemented in English language. Experts team supports such a decision, since this can attract additional students to the study programme and improve cooperation with abroad. Although student count is slowly decreasing over the years, study programme is economically justified and chemistry graduates are needed for the labor market.

Strengths:

1) High demand of graduates in the labor market, that can continue independent research activities or work in the industry.

Weaknesses:

1) High drop out rate of students.

2) Enrollment criteria is not covering all potential candidates for Master level study programme.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Academic Master's study programme "Chemistry" (45441) is developed to give the opportunity to achieve the set of knowledge, skills and competences (SAR, Part 3, Chapter 3.2.1, p. 114). The distribution of credit points for the programme (80 CP/120 ECTS) corresponds to the requirements for Master's study programmes of the National Standard for Academic Education (<https://likumi.lv/doc.php?id=266187>, Annex 22M). The European Chemistry Thematic Network Association (ECTNA) requirements Chemistry Master's programmes were also taken into account (SAR, Part 3, Chapter 3.1.2., p. 110). UL's Master's programme is realized as a combined course, where several specializations are integrated into one programme (SAR, Part 3, Chapter 3.1.2., p. 111).

The volume of compulsory part (part A) of the study programme is planned to decrease till 24 CP (36 ECTS, SAR, MSPC Programme Annexes, The curriculum of the study programme) starting from academic year 2023/2024. This volume of compulsory courses corresponds to the minimum requirements of the National Standard for Academic Education (24 CP, <https://likumi.lv/doc.php?id=266187>).

The content of the compulsory study courses (Part A, 5 study courses, 18 CP) is devoted to three main research sub-directions (Analytical Chemistry, Physical chemistry, and Organic and Biomolecular chemistry) of FC (SAR, Part 3, Chapter 3.2.1., pp. 114-115). Additionally, two Research Projects (6 CP) are included in Part A to provide the necessary research skills and to ensure better preparation of the Master's thesis.

Restricted elective courses (Part B) are divided into two parts: sub-direction (B1) courses that are

interconnected with compulsory study courses (Part A) and optional courses for all sub-directions (B2). Starting their studies, students immediately choose one of the sub-directions of the programme (SAR, Part 3, Chapter 3.2.1., p. 116) and can select courses from both B1 and B2 parts or only compulsory part courses (B1) of other sub-directions. In general, study courses follow the main scientific trends in Chemistry and the content of the study courses (part A and part B) is complementary. The content of study courses corresponds to the objectives of the programme: to give the student the set of knowledge, skills, and competences in one of three sub-directions (Analytical chemistry, Physical chemistry, and Organic and Biomolecular chemistry).

In coordination with employers, a new Study Plan was elaborated (is planned to be implemented from academic year 2023/2024, SAR, Part 3, Chapter 3.2.1., p.115). The Study Plan allows deeper specialization, wider choices and opportunities for interdisciplinarity in the sub-directions of the programme and can improve student's labor-market positioning.

The Master study programme (planned from academic year 2023/2024) complies with Cabinet of Ministers Regulations No. 240, Riga, 13 May 2014 (Minutes No. 28, §18), <https://likumi.lv/ta/id/266187-noteikumi-par-valsts-akademiskas-izglitiba-standartu>; (only in Latvian). Total amount of CP in the Study programme is 80 CP and length of implementation is 2 years; CP are divided as follows: 44 CP in total compulsory part (the Master's thesis, which is the main final component of the compulsory part, counts for 20 CP), 34 CP in total restricted elective part, and 2 CP in the elective course part. Environment Protection with 1 CP and Civil protection with 1 CP are acquired in special cases only if they have not already been acquired at the previous levels of education (SAR, Annex 23M). Based on the information provided by HEI, experts find that other requirements specified in the regulations are also met (SAR, Annex 22M_Compliance of the Master's study programme "Chemistry" with the State Education Standard).

2.2.2.

During the period from 2016 till 2021 a total of 190 Master's Theses in three main scientific directions of the FC (innovative materials and nanotechnology, medicine and life sciences, and development of innovative instrumental analytical methods) were developed. The greater part of the defended Master's Theses (82-93%) during the period 2016-2021 were under supervision of FC teaching staff in the corresponding research directions (SAR, Part 2, Chapter 2.4.5., p. 87; SAR, Part 3, Chapter 3.2.6., p. 124).

The choice of the research topic for Master's Thesis can be done on the basis of "Course project I" (the 2nd semester) or "Course project II" (the 3rd semester) (SAR, Part 3, Chapter 3.2.6., p. 123). The scientific research can be carried out in the departments of FC, scientific institutes (such as Institute of Organic Synthesis, the Institute of Wood Chemistry, BIOR) or chemical production companies (mainly pharmaceutical production companies).

The set of basic requirements to the Master's Thesis were elaborated. These requirements can be divided into two parts: requirements to the scientific research and requirements to the description of the obtained results. The Master's Thesis must meet these basic requirements. As a result, the achievements of a part of the defended Master's Theses (25-45%) have been published as a scientific publication (or as part of a scientific publication) in Scopus or WoS indexed journals with the 88 students being a co-author or even the first author (SAR, Part 2, Chapter 2.4.5., p. 88; SAR, Part 3, Chapter 3.2.6., pp. 124-125).

2.2.3.

Academic Master's study programme "Chemistry" 45441 study implementation includes a variety of knowledge acquisition and consolidation methods such as the different types of lectures (introductory, interactive, consolidating lectures, and problem-oriented), assignments, seminars, individual and group work as well as laboratory work. Employers and professionals from different institutions are invited to teach individual lectures in study courses to promote the unity of theory

and practice (SAR, Part 3, Chapter 3.2.3., p. 120). Students' achievements are assessed at two levels: (a) qualitative assessment - (grade on the 10-point scale); (b) quantitative assessment - number of credit points (SAR, SAR, Part 3, Chapter 3.2.3., p. 122). Disputable is the principle when the study process is compressed to slightly more than 2 days weekly (on-site visit, 24.-25.04.23.). This approach can affect the aim and learning outcomes of the study courses (SAR, MSPC Programme Annexes, Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme). According to the student's survey data (SAR, Annexes, Analysis of the results of surveys of students, graduates and employers, Tables 5 and 6), independent work outside the studies (for a longer time than 15 hours per week) is necessary in case of 40-45% of students. At the same time more than 90% of students have declared full/part time employment.

A few approaches are used to realize the student-centered learning: the updating of the study programmes, clear formulation of learning outcomes, individual approach of the teaching staff to consultations and use of e-learning environment (as the Moodle system and Microsoft Teams platform). Students' proposals for the improvement of study programmes and processes as well as the results of student surveys are considered for the improvement of the study process (SAR, Part 3, Chapter 3.2.3., pp.120-121).

Additionally, psychological support is provided by the Study Service Department for solving both personal and study issues (SAR, Part 2, Chapter 2.3.8., p. 69).

A full offer of Master's study program "Chemistry" courses in English has been prepared and it is planned to use the same methods that are used for the implementation of the program in Latvian (SAR, p.122). It is expected that in the first years of the study program implementation in English the number of students can be low. In this situation a personalized approach to each student will be applied.

According to the experts, the methods of study implementation contribute to achieving the aims and learning outcomes of the study courses and the study programme.

2.2.4. Not applicable.

2.2.5. Not applicable.

2.2.6.

The Master's thesis must be developed in accordance with the UL regulations "Requirements for the development and defence of final theses" (Bachelor's, Master's theses, diploma theses and qualification theses) (UL regulations No. 1/454 of 11.02.2020) and in accordance with the "Instructions" approved by the Council of the Faculty of Chemistry for the development, design and evaluation of course work and final theses (approved at the 13.04.2022 meeting of the FC Council). The Master's thesis is evaluated by the Master's final examination commission, taking into account the recommendation included in the reviewer's review. Guidelines have been developed for evaluation, which describe the evaluation criteria for the defense of works. The overall assessment of the work is formed as the average of the assessment for B1 (Content and structure of work, 60% weight) and B2 (Defense of work, weight 40%) parts. The selection of topics for master's theses is done individually, in consultation with the teaching staff of the faculty. Initially, the topic of the research work is selected in the 2nd semester in the study course "Course project I". Most of the students continue to develop the chosen topic in the 3rd semester course "Course project II" (SAR, Part 3, Chapter 3.2.6., p. 123; on-site interview with students, April 24th and 25th, 2023).

The areas of research topics include Chemistry and nanotechnology, Development of innovative functionalized or chemically modified materials, Development of new analytical research methods, Nanomaterials for energy and sensor, Radiation chemistry and radiochemistry and finally Organic synthesis and research in the field of medicine and life sciences, where bachelor theses are developed mainly at the Faculty of Chemistry and the OSI (SAR, Part 3, Chapter 3.2.6., pp. 160-162).

During the on-site interview with students the issue with writing the thesis in Latvian only was raised, students stated that English language would be preferable for them and that would also internationalize their work. Finally, the theses are not publicly available.

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

Academic Master's study programme "Chemistry" complies with national regulation. Courses of the programme are interconnected, complementary and give the opportunity to achieve the learning outcomes. The regular updating of the part of the courses allows to follow the scientific and labor market trends as well as the needs of the industry. The topics of the students' theses follow the main sub-directions of FC and correspond to the programme but e-repository of thesis is not public.

Strengths:

- 1) Organization of the the study environment and use of the student-centered learning approach;
- 2) Coordination with employers in the revision and updating of the courses;
- 3) The high involvement of the students in the scientific research activities that resulted in the numerous scientific publications with the 88 students being a co-author or even the first author during the period 2016-2021.

Weaknesses:

- 1) E-repository of thesis is not public.
- 2) The high combined workload of students that can have influence on the study results and the drop-out rate.

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

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

Assessment of compliance: Fully compliant

The Master's study programme contains the set of the well-balanced courses (SAR, Annexes 23M and 24M) that are based on the achievements in the field of chemistry.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

MSP "Chemistry" is implemented at the UL FC, which is located in the UL Academic Center, on the 6th floor and in the basement of the House of Nature. The total area of FC is 1,900 square meters, of which teaching and scientific laboratories occupy 1,220 square meters. All auditoriums and seminar rooms located in the House of Nature are available to students. They are equipped with projectors, most of them also with an electronic whiteboard. Student teaching laboratories are equipped with modern teaching equipment, including analytical balances, rotary evaporators, pH meters, titrators TitraLab880 and Karl Fisher titrator, thermostats UNB500, UV-VIS spektrometer and FTIR spectrometer, air analyzers (ozone analyzer, NOx analyzer, aerosol particle analyzer), as well as with AutoLab potentiostats (SAR, Part 3, Chapter 3.3.1., p. 126).

Master's programme students use the scientific research infrastructure that is available at the FC for laboratory work and especially in research (course work, master's thesis), including an HPLC-MS system with a TOF detector, a GC-MS system GCMS-QP2010 and quadrupole ISQ7000, an AAnalyst 600 electrothermal atomic absorptiometer AAnalyst 600, inductively coupled plasma triple

quadrupole mass spectrometer ICP-QQQ, differential scanning calorimeter DSC25 (TA), nuclear magnetic resonance spectrometer Ultrashield 300, elemental analyzer of isotope ratios, powder X-ray diffractometers D8 Advanced, thermogravimeter TG/DTA600, fluorescence spectrometer Aminco Bowman AB-2, etc. (SAR, Part 3, Chapter 3.3.1., p. 126).

The Natural Sciences Library has a spacious room for each student and for groups to study and do group work (site visit April 24). Each student can use the library 24 hours a day. As described in the chapter 1.3. Resources and Provision of the Study Field, UL staff and students have the opportunity to use the following in the library: free access to the collection, self-service facility for home delivery of books, renewal and check-out, computers, cell phone charging. All laptops available in the library are equipped with licensed software needed for the requirements of the study programme. The total number of new titles added to the UL Library was 617 in Chemistry, of which 305 titles are available in the Natural Sciences Library. The print collection includes books, serials, journals, dissertations, and abstracts in Latvian, English, German, and Russian. Currently, the e-resource repository contains more than 5712 publications in the field of study "Chemistry, chemical technology and biotechnology". In 2021, the UL provides access to 42 e-resource platforms (e-book platforms, e-journal databases and individual subscribed e-journals, reference resources and tools, mixed format databases). In total, there are 17,477 full-text e-journals (including individual subscribed e-journals), 205,306 e-books, nearly 5 million full-text and abstracts of doctoral and master's theses from around the world available through subscriptions. The UL also provides links to 174 credible open access databases of multi-format materials (SAR, Part 2, Chapter 2.3.3., pp. 52-53).

The UL Library regularly provides trial access to various databases, averaging 10-15 per year (SAR, Part 2, Chapter 2.3.3., p. 54).

The library's collection in general corresponds to the implementation of studies and the development of research, as its stocks are supplemented each year with the latest information resources according to the information needs of academic staff and students (SAR, Part 2, Chapter 2.3.3., p. 56).

According to the experts, the library is adequately equipped and fully meets the requirements associated with the implementation of the both study programmes in Latvian and in English.

2.3.2. Not applicable.

2.3.3.

In order to secure the necessary funds for the implementation of the MSP "Chemistry", the University of Latvia uses a state budget grant from the Ministry of Education and Science or tuition fees. In order to estimate the amount of funds needed for financing, the costs of study programmes at UL are calculated according to the methodology developed by UL, which takes into account the costs of providing the study process and information on the study programme plan, as well as the reliability of forecasts (SAR, Part 3, Chapter 3.3.3., p. 128).

Tuition fees are determined by competition with tuition fees of related study programmes of Latvian universities and the small number of fee-paying students in chemistry programmes. There is a mechanism to change the tuition fees and they can be changed as needed. Coordination of tuition changes is always University-wide with active student participation. Insufficient budgetary resources (plus fees) are offset by other FC-generated revenue. In addition, programme development may be funded by other FC-generated revenues (through projects and collaborations with the corporate sector) and by funds accumulated by the structural unit (SAR, Part 3, Chapter 3.3.3., p. 132).

Programme implementation costs consist mainly of teaching staff costs (approximately 45 percent), general staff costs (approximately 5 percent), and indirect costs (26 percent) (SAR, Part 3, Chapter 3.3.3., p. 129).

To cover all costs of running the MSP "Chemistry" in Latvian, there should be at least 65 places for students funded by the state.

To cover all costs of the MSP "Chemistry" in English language, 6 places for students from the European Union/European Economic Area/Swiss Confederation with tuition fees and 19 places for students from outside the EU/EEA/Swiss Confederation with tuition fees are foreseen (SAR, Part 3, Chapter 3.3.3., p. 128). In order for the English language programme to be cost-effective and for students to be able to study at a high level quality, the number of fee-paying international students in the programme (in all courses combined) must be at least 25. At the beginning of the implementation of the English language MSP "Chemistry" study programme, the number of students in the first years could be lower; in such cases, the group can be formed only in one sub-direction. Taking into account the fact that students of Latvian classes can also take up to 16 credit points of restricted elective courses in English, it will be possible to form combined groups in some courses of MSP "Chemistry" in English, which could be worthwhile (SAR, Part 3, Chapter 3.3.1., p. 131). According to the April 24 on-site interviews, FC applies to internal and external projects in which additional endowments are diverted to provide financial support for students and faculty.

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

UL has a strong provision of resources: fully purchased equipment park. The equipment and apparatus are fully available for research works and for student teaching. The library has a wide, open space, where to study and use all accessible resources. UL full-fledged uses the e-study environment Moodle. Study programme is fully financed from the state budget, by other FC-generated revenue. For English study programmes they also provide studying resources in English. According to the experts, the library is adequately equipped and fully meets the requirements associated with the implementation of the both study programmes in Latvian and in English.

Strengths:

1) High equipped laboratories with high level instruments that can be used for research and for teaching/ learning.

Weaknesses:

1) Increasing the number of students and/or tuition fees could be necessary to increase the cost effectiveness of the study programme.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The University of Latvia has a modern material and technical base, which provides a high-quality advanced learning environment. Facilities and laboratory equipment of the Centre of Natural Sciences offer a wide range of research and learning opportunities for students (SAR, Part 3, Chapter 3.3.1., page 126).

The library is adequately equipped and fully meets the requirements associated with the implementation of the study programme (SAR, Part 2, Chapter 2.3.3., pp. 51-56).

According to the experts, all available resources are sufficient for the implementation of the study programmes in Latvian and English.

2.4. Teaching Staff

Analysis

2.4.1.

The implementation of the MSPC in the academic year 2021/2022 involved academic staff from the FC, the Department of Environmental Science of the Faculty of Geography, the Department of Microbiology and Biotechnology of the Faculty of Biology, the Office of State Forensic Expertise, and the Latvian Institute of Organic Synthesis. A total of 34 academic staff members, including 9 professors (one guest professor), 8 associate professors, 3 assistant professors, 3 lecturers, 4 researchers, and 7 guest lecturers, were involved in the implementation of the study program. Taking into account that a total of 8 guest teachers are involved in the implementation of the MSPC, it results that 76% of those employed at UL participate in the implementation of the study program (SAR, Part 2, Chapter 3.4.1., pp. 132-133; SAR, MSPC Programme Annexes, Descriptions of the study courses/modules). The number of professors and associate professors (17 in total, 50 % of the staff involved in the implementation of the MSPC) thus complies with Article 55.1.3. of the Law on Higher Education Institutions which specifies the number of professors and associate professors involved in the implementation of the compulsory and restrictive elective parts of the study programme (SAR, MSPC Programme Annexes, Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions; SAR, MSPC Programme Annexes, 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). In addition, according to the available information, 90% of the staff involved in the implementation of the MSPC have a PhD (SAR, Part 2, Chapter 3.4.1., p. 133).

According to the experts, the teaching staff is highly qualified and their research activities fully cover the areas they teach at MSPC. The academic staff involved in the implementation of the MSPC are highly qualified lecturers and leading specialists in the field of chemistry, which enables the delivery of the MSPC in accordance with the highest possible standards of the profession and provides the necessary conditions for the acquisition of the intended learning outcomes of the study program. For example, a leading specialist in the field and member of the Latvian Academy of Sciences is involved in the delivery of the compulsory course "Innovation processes in chemistry", while another professor, also a member of the Latvian Academy of Sciences, is involved in the delivery of the restricted elective courses "Organic synthesis I" and "Organic synthesis II". Additionally, the research interest of the professor involved in the implementation of the courses "Nuclear magnetic resonance spectroscopy", "Organic chemistry", "Stereochemistry" and "Chemistry of natural compounds" lies in the application of nuclear magnetic resonance and other physical-organic chemistry methods in solving problems of organic chemistry, stereochemistry as well as biomolecular chemistry (SAR, MSPC Programme Annexes, Descriptions of the study courses/modules; SAR, Annexes, Biographies of the teaching staff members). It should be noted that one of the professors, independently or together with other teachers, is involved in the delivery of 5 compulsory courses and 3 restricted elective courses (SAR, MSPC Programme Annexes, Descriptions of the study courses/modules), which seems to be too much. Although this professor is an excellent scientist and teacher, considering the total number of teachers involved in the implementation of the MSPC, this distribution of the teaching load does not seem to be rational and balanced, so one would say that it should have been changed in one of the future development of the study programme. To make matters worse, this professor is also the director of the study programme.

As with the BSPC, there are usually several teachers involved in the delivery of the course. For example, three academic staff members are involved in teaching the course "Chemical Biology," one professor and two teachers. The situation is similar for other courses, so that ultimately, even if some of the academic staff involved in the delivery of the courses are absent, the smooth delivery of the courses is ensured (SAR, Part 2, Chapter 3.4.1., p. 132; SAR, MSPC Programme Annexes, Descriptions of the study courses/modules).

Knowledge of the Latvian and English languages of all members of the academic staff is in accordance with the requirements prescribed by the Law on Higher Education (SAR, Annexes, 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.; SAR, Annexes, 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).

The age structure of assistant professors, researchers, and research assistants should be emphasized, which includes a large number of young staff members at FC, which will ensure easy and effective takeover of teaching duties from more experienced teachers upon their retirement in the future (SAR, Part 2, Chapter 3.4.1., p. 134).

2.4.2.

The changes in the composition of the academic staff involved in the implementation of the MSPC were mostly related to generational changes and the need to improve and modernize the quality of the study programme. In addition, it should be noted that the qualification of the teaching staff has improved significantly and the number of teachers involved in the implementation of the study program has also increased (SAR, Part 2, Chapter 3.4.2., p. 134; SAR, MSPC Programme Annexes, Descriptions of the study courses/modules; SAR, Annexes, Biographies of the teaching staff members). Consequently, changes in the composition of the teaching staff had no impact on the performance of the study program during the accreditation period, had no negative impact on the implementation of the MSPC and the compliance of the MSPC with the requirements set forth in the legal acts, quite the contrary.

In the period since the last accreditation (2013), 9 teachers are no longer involved in the delivery of the study program, but they have been replaced by 13 new teachers who were elected to academic positions for the first time since accreditation. In addition, 9 teachers have been promoted to higher positions of professors and associate professors, and all of these teachers, without exception, are well-known in their scientific fields, as evidenced by their publications and participation in various projects, as well as expert privileges granted by the Latvian Council of Science (SAR, Part 2, Chapter 3.4.2., pp. 134-135; SAR, Annexes, Biographies of the teaching staff members). Due to the expansion of the study program, in addition to the teachers from FC, 6 teachers from other components of UL (Faculty of Biology, Faculty of Geography and Earth Sciences, Institute of Solid State Physics) were involved in the implementation of the study program, and in addition, 4 young scientists from the Latvian Institute of Organic Synthesis and three guest lecturers, one of whom will be a teacher from abroad, will be involved in the implementation of the MSPC (SAR, Part 2, Chapter 3.4.2., p. 134).

It should be noted that regardless of the relatively large number of visiting professors from other institutions, the insufficient number of visiting professors from abroad should be highlighted as a serious deficiency, especially in the case of conducting MSPC in English, which should be addressed in the coming period. According to the experts, it is strongly recommended that at least 5% of all teachers involved in the implementation of the study programme are teachers from prestigious universities or scientific institutions abroad.

2.4.3. Not applicable.

2.4.4.

Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions in accordance with the Law on Higher Education Institutions. A list of scientific publications (indexed in Scopus or WoS) relevant to the research areas pursued by the academic staff and students of Faculty of Chemistry in the period 2016-2021 is available in SAR

(Annexes, List of the publications, patents, and artistic creations of the teaching staff over the reporting period). The number of publications, patents and conference abstracts is summarised in Table 11, (SAR, Part 2, Chapter, 2.4.1., p. 75).

2.4.5.

Mechanisms that ensure changes and improvements to the study program for the purpose of better interconnection of different study courses have been established. Proposals related to this are discussed and considered at the Study Programs Council meetings and at the Study Field Council meetings, taking into account, in addition to current scientific trends, student proposals collected in the framework of various surveys that are periodically carried out according to the established procedures that regulate this quality assurance area (SAR, Part 2, Chapter 3.4.5., p. 137).

In addition, the cooperation of the teaching staff on issues related to the implementation of the study program is ensured by holding various meetings and/or by communication via e-mail organized by the FC and MSPC management. Depending on the topics, if necessary, individual meetings with the teaching staff, as well as group meetings at the departments, are organized (SAR, Part 2, Chapter 3.4.5., p. 137).

The teaching in most study courses is organized in such a way that a larger number of teachers participate in it, regular mutual cooperation of the teachers involved is necessary to ensure effective teaching process. This is done, for example, in such a way that one of the teachers is responsible for content changes in the LUIS system, another for the distribution and coordination of activities between the involved teachers, the third for other administrative issues related to teaching process, etc (SAR, Part 2, Chapter 3.4.5., p. 137).

The extremely small student/teacher ratio (2 students per teacher in academic year 2021/2022) should be highlighted as one of the main characteristics of MSPC (SAR, Part 2, Chapter 3.4.5., p. 171). The above enables the teacher to effectively and often on an individual basis transfer the competences, knowledge and skills necessary for the acquisition of the planned learning outcomes. At the same time, this is also a major drawback of the study program, because it is difficult to justify (economic and organizational) having such a large number of teachers working with a small number of students.

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

The qualifications of the teaching staff involved in the implementation of the study programme meet the requirements for the implementation of the study programme and enable the achievement of the objectives and learning outcomes of the study programme and the corresponding study courses. The changes in the composition of the teaching staff do not negatively affect the implementation of the MSPC and the MSPC's compliance with the requirements set forth in the legal regulations, quite the contrary. Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions in accordance with the Law on Higher Education Institutions. Mechanisms to ensure changes and improvements in the study programme for the purpose of better linking the different study courses have been established and are effectively applied, ensuring the achievement of the study programme objectives and the adoption of learning outcomes.

For some of the professors, the teaching load is not balanced and rational. For successful and effective implementation of MSPC, especially in English, the participation of visiting professors from abroad should be increased. The students/teachers ratio should be increased to make the program economically viable and feasible without additional funding from other revenue from UL and FC.

Strengths:

1) A large number of distinguished scientists with the highest academic titles are involved in the

implementation of the study program.

Weaknesses:

- 1) The teaching load of some professors is not balanced and rational.
- 2) The participation of visiting professors from abroad should be increased, especially in the implementation of MSPC in English.
- 3) Extremely low ratio of students/teachers involved in the implementation of the study programme.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff and visiting professors, associate visiting professors, visiting docents, visiting lecturers and visiting assistants is in compliance with the conditions for the implementation of the study program and the requirements set forth in the respective legislation. Just one foreign specialist, four young scientist from the Latvian Institute of Organic Synthesis and three guest lecturers (with not known academic positions) are foreseen to be involved in the implementation of the MSPC (SAR, Part 2, Chapter 3.4.1., pp. 134-136; SAR, MSPC Programme Annexes, Descriptions of the study courses/modules).

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

According to information provided in the Annex 22M, the Master's study programme "Chemistry" is fully compliant to the State Education Standard.

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

SAR contains the description of the requirements for the study courses and study materials such as requirements starting a study course, the purpose of the study course implementation, the planned study results, the content of the study course, mandatory literature and supplementary literature (SAR, Annex 24M), the evaluation criteria of study results that complies the Law on Higher Education Institutions (Augstskolu likums (likumi.lv)).

The descriptions of the study courses have been prepared in Latvian and English (SAR, Annex

24M).

In general, the literature included in the course descriptions is up-to-date and provides the combination of Compulsory Reading List (in English, in some cases accompanied by lecture notes), Further Reading List and Periodicals/Other Sources. Only a few sources of information are in Latvian (SAR, Annex 24M).

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

Assessment of compliance: Fully compliant

The sample of the diploma to be issued with additional information on the national higher education system is provided (Annex 19M).

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

Assessment of compliance: Fully compliant

According to the Law on Higher Education Institutions at least five professors and associate professors should be among the teaching staff members (Augstskolu likums (likumi.lv)). The academic staff of the Master's study programme fully complies with the requirement (Annexes 10 and 24M).

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The Head of study field certified the Latvian language proficiency of the academic staff involved in the implementation of the study programme "Chemistry" (code 45441) (Annex 11) according to the State Regulation (<https://likumi.lv/ta/id/330669-noteikumi-par-valsts-valodas-zinasanu-apjomu-valsts-valodas-prasmes-parbaudes-kartibu-un-valsts-nodevu-par-valsts-valodas-prasmes-parbaudi>).

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

Assessment of compliance: Fully compliant

It is planned to realize the Master's study programme in two languages (Latvian and English) starting from ac. year 2023/2024. According to Annex 10 a greater part of the teaching staff members have at least B2-level knowledge of English and at least one of the teaching staff members involved in the implementation of the definite study course has B2-level knowledge of English (Annexes 9, 10 and 24M).

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

Assessment of compliance: Fully compliant

Annex 7 contains the agreement form for studies at the University of Latvia in the selected programme, according to the requirements of the programme and the normative rules of the UL related to the study process.

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

Assessment of compliance: Fully compliant

The agreement between the UL and Riga Technical university confirms the opportunities for continuation of studies in the study programme of the Master's study programme "Chemistry and Chemical Technology" (45528) if the implementation of the UL study programme is terminated (SAR, Annex 5). It is not clear from the agreement between the UL and Riga Technical University whether the same applies to the study program that will be conducted in English.

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

Assessment of compliance: Fully compliant

Refund and Compensation Policy is declared in the Statement (Annex 6A) and follows the Cabinet of Ministers Regulation No. 795 "Regulations Regarding Licensing of Study Programmes".

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the requirements set forth in the Law on Higher Education Institutions and other regulatory enactments. According to experts, programme compliance to State academic Education Standard, complies to Regulations of Cabinet of Ministers No. 202. "Kārtība, kādā izsniedz valsts atzītus augstāko izglītību apliecinājošus dokumentus", Section 55, paragraph 1, Clause 3 of the Law on Higher Education Institutions of the Republic of Latvia.

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

The study programme is characterized by numerous advantages in its implementation, which distinguish it from similar programs and which should be highlighted. First of all, highly qualified and motivated teaching staff, whose research activities fully cover the areas of the study programme. Also, the involvement of several professors and other academic staff in the implementation of most of the individual courses, which enables the smooth implementation of the study program even in the absence of some of the academic staff (which in turn enables the mobility of academic staff, which should be used in the future). Consequently, this facilitates the organization of the study environment and the application of the student-centered learning approach, which is one of the great strengths of the MSPC. Ultimately, this leads to a high degree of student involvement in scientific research activities, which is reflected in numerous scientific publications where students are co-authors or even first authors. In addition, the coordination with employers in revising the study program and updating the courses should be highlighted as a positive side of the development of the study program. Consequently, there is a great demand for graduates in the labor market.

The main disadvantages of the study program are the high dropout rate and the insufficient participation of visiting professors and researchers in the implementation of the study programme which may prove to be a major challenge in the implementation of MSPC in English. The high combined workload of students is probably the main reason for the extremely high and quite unusual dropout rate in the master's program. In addition, it should be noted that the thesis e-repository is not public. The teaching load of some professors is not balanced and rational. There is also a lack of analysis of the combined student workload (especially in the first year of study). Additional analysis of tuition costs should be considered to set tuition fees appropriately, which can be achieved by increasing the number of students enrolled. The enrollment criteria are not appropriate because they do not cover all potential candidates for Master level study programme from some relevant fields of study, such as biotechnology for example. The students/teachers ratio should be increased to make the program economically viable and feasible without additional funding from other revenue from UL and FC.

Considering the fact that FC has a sufficient number of teachers who are excellent and internationally recognized scientists, fluent in English and not burdened by teaching in Latvian, the expert group believes that the introduction of the English-language master's program should be supported. In addition, according to the experts, the excellent equipment of the classrooms and (student) laboratories as well as the cooperation with other scientific institutions and the economy are to be seen as good prerequisites for the implementation of the English-language study program.

Evaluation of the study programme "Chemistry"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Chemistry"

Short-term recommendations

Analysis of study costs should be considered in order to set the tuition fees appropriately (till academic year 2024/2025).

Analysis of the combined student workload should be conducted (till next academic year).

The teaching load of academic staff should be balanced and rational (till academic year 2024/2025).

The enrollment criteria should be changed to include all potential applicants to master's programmes from all relevant bachelor study fields (till academic year 2024/2025).

Long-term recommendations

The drop-out rate should be decreased and additional measures for it should be developed (until the next accreditation).

Additional and adequate measures should be developed to attract a greater number of candidates from the country and from abroad who will enroll in the study programme (especially study programme in English) (within 3 years).

The number of visiting professors and researchers involved in the implementation of the study programme should be increased (until the next accreditation).

The e-repository of the thesis should be publicly available (within 3 years).

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

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Assessment of the Requirements for the Study Field

Requirements	Requirement Evaluation	Comment
R1 - Pursuant to Section 5, Paragraph 2.1 of the Law on Higher Education Institutions, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing its internal quality assurance system:	Fully compliant	All criteria are fully compliant and fulfilled. Quality assurance system is working and enables continuous development of study field and study programmes while evaluating performance of students and academic staff members.

Requirements	Requirement Evaluation	Comment
R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)	Fully compliant	The directions of scientific research of the study field correspond to the development goals of the higher education institution and are relevant for the study field and industry. UL has developed mechanisms for the involvement of the teaching staff in scientific research (SAR, Part 2, Chapter 2.4.).
R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.	Fully compliant	Scientific cooperation with other faculties and scientific institutes of UL is carried out at all levels of the programmes, developing research projects and both study levels theses (SAR, Part 2, Chapter 2.5.1., p. 91). Collaboration with institutes and the business community, established at the national level, enables the efficient implementation of study programs and the acquisition of learning outcomes by students (SAR, Part 2, Chapter 2.5.1., p. 9093). Signed agreements with foreign higher education institutions form the basis for the mobility of students and teachers. Particularly important is the cooperation with ECTNA, which enables the evaluation of study programs in the field of chemistry, resulting in the acquisition of the "Chemistry Eurobachelor" and "Chemistry Euromaster" quality labels (SAR, Part 2, Chapter 2.5.2., p. 93-94). Mobility of students and teaching staff, both incoming and outgoing, is low and should be further developed and encouraged (SAR, Annexes, Statistical data on the incoming and outgoing mobility of students; Statistical data on the incoming and outgoing mobility of the teaching staff).

Requirements	Requirement Evaluation	Comment
R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.	Fully compliant	The provided recommendations (Joint report of experts (2011)) as well as Recommendation to the Master's study program (2021) were analyzed by FC staff and the greater part of recommendations were implemented in the study courses at the Bachelor and Master's programme levels (SAR pp. 98-101; Annexes 18, 23 and 24). The weaknesses identified during the evaluation of the implementation of the Recommendations (2013 and 2021) have limited impact on the study's quality or can be explained by objective reasons such as COVID -19 pandemic.

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

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)
1	Chemistry (43441)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Good
2	Chemistry (45441)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Good

The Dissenting Opinions of the Experts

There are no dissenting opinions of the Experts.