# APPLICATION

## Study field "Manufacture and Processing" for assessment

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|---|---|
| Study field | *Manufacture and Processing* |
| Title of the higher education institution | *Latvijas Lauksaimniecības universitāte* |
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# Self-evaluation report

Study field "Manufacture and Processing"

Latvijas Lauksaimniecības universitāte

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# I - Information on the Higher Education Institution/College

## 1.1. Basic information on the higher education institution/ college and its strategic development directions, including the following information:

Latvia University of Life Sciences and Technologies (LLU) is the fourth-largest university in Latvia (established in 1936 as an independent higher education institution) which implements studies and research for various industries of the national economy and which has developed relevant educational and research competence and expertise in:

- unique fields: agriculture, forestry, veterinary medicine, food technology and landscape architecture;
- universal fields: information technology, economics and social sciences, agricultural engineering, environmental sciences, civil engineering and pedagogy, as well as nutrition science.

LLU **vision –** Latvia University of Life Sciences and Technologies is one of the leading science and technology universities of the Baltic Sea region, with a specialisation in the sustainable use of natural resources to improve the life quality of society.

**Mission –** to build internationally competitive intellectual potential based on excellence in research, application of research results in the national economy, high quality of studies and effective university management.

**LLU long-term goals**:

1. Excellence in research that promotes technology and innovation and is integrated into the study process.
2. High-quality studies that provide the development of internationally competitive specialists.
3. Effective university management ensures the targeted and efficient use of resources for high-quality studies and excellence-focused research.

**LLU medium-term objectives** are subordinated to the vision, the mission and the long-term goals and are as follows:

1. Excellence in research.
2. Application of research results in the national economy (research results are understood to mean the university's knowledge, technology and innovation accumulated and generated).
3. Integration of studies and research.
4. Internationalisation of studies and lifelong education.
5. High quality and competitive studies that meet the current demand.
6. Diversified supply of lifelong education that meets the current demand.
7. Effective university management at all levels.

The LLU Development Strategy for 2015-2022 (https://www.llu.lv/index.php/en/mission-and-vision) prescribes three action programmes with relevant targets to achieve the long-term goals:

1. Research Programme;
2. Education Programme;
3. Management Programme.

LLU is comprised of the following eight faculties:

1. **LF** – the Faculty of Agriculture (established in 1863);
2. **VMF** – the Faculty of Veterinary Medicine (established in 1919);
3. **MF** – the Forest Faculty (established in 1920);
4. **TF** – the Faculty of Engineering (established in 1944);
5. **VBF** – the Faculty of Environment and Civil Engineering (established in 1947);
6. **PTF** – the Faculty of Food Technology (established in 1948);
7. **ESAF** – the Faculty of Economics and Social Development (established in 1968 as the Faculty of Agricultural Economics; in 2013, the Faculty of Economics merged with the Faculty of Social Sciences);
8. **ITF** – the Faculty of Information Technologies **(**established in 2001).

Totally, the Faculties of LLU implement 61 study programmes within **14** study directions (as of October 1, 2020).

Table 1.1.1.

**Number of students and programmes in LLU study directions**

*B – bachelor programmes; M – master programmes; D – doctoral programmes*

| **No.** | **Study direction** | **Number of programmes** | | | | **Number of students** (01/10/2020) | **Faculties** |
|---|---|---|---|---|---|---|---|
| | | **Total** | **B** | **M** | **D** | | |
| 1 | Agriculture, Forestry, Fishery, and Food Hygiene | **12** | 6 | 3 | 3 | 1,140 | LF, MF, VMF |
| 2 | Architecture and civil engineering | **9** | 5 | 2 | 2 | 434 | VBF |
| 3 | Production and processing | **8** | 4 | 2 | 2 | 443 | PTF, MF, TF |
| 4 | Information technology, computer engineering, electronics, telecommunications, computer management and computer science | **4** | 2 | 1 | 1 | 286 | ITF |
| 5 | Environmental protection | **3** | 1 | 1 | 1 | 98 | VBF |
| 6 | Health care – a joint Master's study programme with LU and RSU | **1** | | 1 | | 22 | PTF |
| 7 | Mechanics and metal working, heat power engineering, heat engineering and mechanical engineering | **6** | 4 | 1 | 1 | 272 | TF |

| No. | Study direction | Number of programmes | | | | Number of students (01/10/2020) | Faculties |
|---|---|---|---|---|---|---|---|
| | | **Total** | **B** | **M** | **D** | | |
| 8 | Power industry, electrical engineering and electrical technologies | **1** | 1 | | | 85 | TF |
| 9 | Sociology, Political Science, and Anthropology | **2** | 1 | 1 | | 68 | ESAF |
| 10 | Economics | **3** | 1 | 1 | 1 | 389 | ESAF |
| 11 | Management, administration and real estate management | **5** | 2 | 3 | | 342 | ESAF |
| 12 | Hotel and restaurant service, tourism and recreation organisation | **1** | 1 | | | 141 | PTF |
| 13 | Internal security and civil defence | **1** | | 1 | | 53 | MF |
| 14 | Education, pedagogy and sports – **the direction to be closed in 2023** | **5** | 2 | 2 | 1 | 118 | TF |
| | **Total** | **61** | **30** | **17** | **12** | **3,891** | |

LLU personnel, job positions and age group statistics information are presented in Table 1.1.2.

Table 1.1.2.

**LLU personnel, job position and age group statistics** (as of October 1, 2020)

| **University personnel** | **Total** | incl. women |
|---|---|---|
| | **957** | **652** |
| incl. academic staff members who have been elected at LLU | 305 | 190 |
| professors | 57 | 33 |
| associate professors | 53 | 36 |
| assistant professors | 64 | 47 |
| lecturers | 40 | 30 |
| leading researchers and researchers | 91 | 44 |

| | | |
|---|---|---|
| Academic staff members – professors, associate professors, assistant professors, lecturers – who are also elected as leading researchers and researchers | 156 | 105 |
| **Other personnel** | **652** | **462** |
| Academic staff who have not been elected at LLU (visiting professors, visiting assistant professors, visiting lecturers) | **253** | **153** |
| of which foreign visiting professors, visiting assistant professors, visiting lecturers | **21** | **4** |
| Distribution of *academic staff members* by age: | | |
| 25–29 years | 4 | 3 |
| 30–34 years | 21 | 12 |
| 35–39 years | 49 | 24 |
| 40–44 years | 39 | 28 |
| 45–49 years | 46 | 32 |
| 50–54 years | 30 | 24 |
| 55–59 years | 31 | 23 |
| 60–64 years | 41 | 26 |
| 65 years and over | 44 | 18 |

227 members of the total academic staff have a scientific degree (74.43%).

LLU promotes and supports the engagement of young teachers in academic work. Of the current academic staff, 52% are less than 50 years old, 33% are from 50 to 65 years old and only 14% are over 65 years old.

### Changes in the number of students at LLU in the period 2013-2020 (October 1 of each year)

In the period from the academic year 2013/2014 to the academic year 2020/2021, the total number of students accounted around 4,000. The decrease in the number of students over the six-year period reflects overall negative demographic trends concerning the natural increase of population and migration. The total number of students at LLU decreased by 18% over the six-year period, yet a positive fact is that the number of students tends to remain stable in last years. Overall, the total number of students was affected by the processes occurring in the country: 1) the number of individuals who finished the secondary school decreased by 20% in the reference period; 2) the number of individuals who finished their secondary school and continued their education at university was very volatile from year to year: a 5% decrease in 2015 and 2017 and a 1.2% increase in 2014 and 2018. Currently (in 2020), the number of students has levelled off, and there has even been a slight increase in the total number of students studying at LLU compared with the previous year.

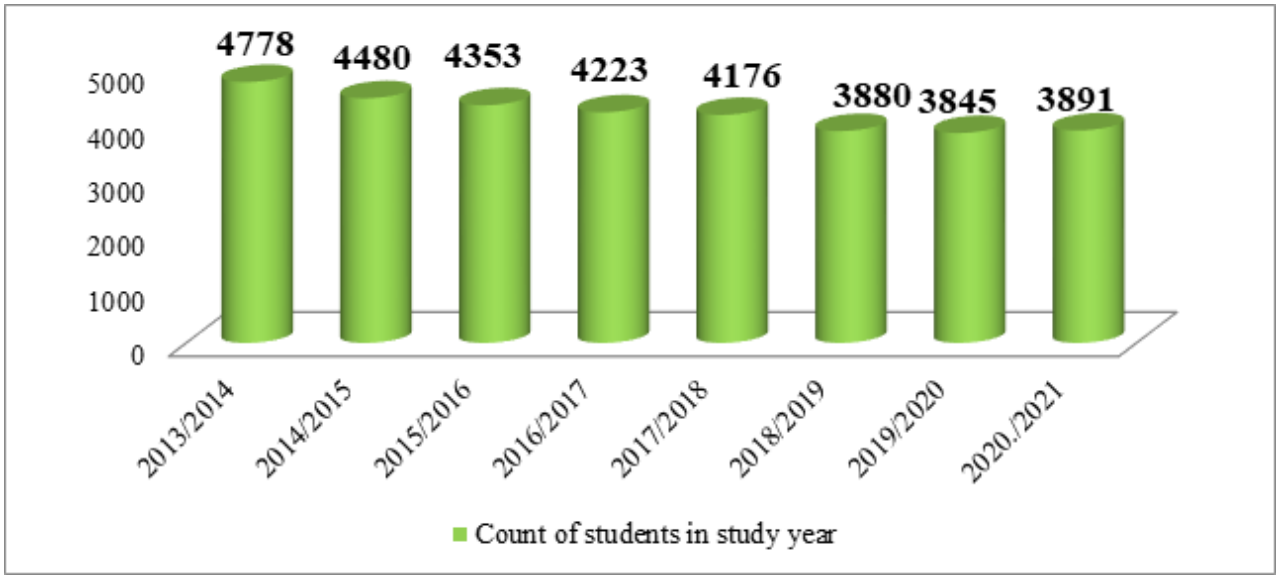


Figure 1.1.1. **The total number of students in the period from 2013/2014 till 2020/2021**

After the university had succeeded in tackling the external factors affecting the number of students, a number of reasons for the decrease in the number of students were established; the reasons were identified from the analysis of the matriculation of students.

The major reasons are as follows:

1. There was a considerable increase in the number of students who discontinued their studies during the first semesters owing to the wrong study programme or study direction chosen, their jobs or private life problems;
2. Some students could not continue their studies because of financial problems or due to the schedule requirements (especially working part-time students) since they could not combine studies with their working hours;
3. Master's degree students were unable to combine studies with their jobs;
4. Interest in doctoral studies tended to decrease because financial support for doctoral students was insufficient (a monthly scholarship determined by the state was EUR 113.83), and the availability of funding for research was limited.

The distribution of the number of students by level of studies at LLU in the reference period was as follows:

1. Bachelor's degree studies – 79-84%;
2. Master's degree studies – 13-17%;
3. Doctoral studies – 4%.

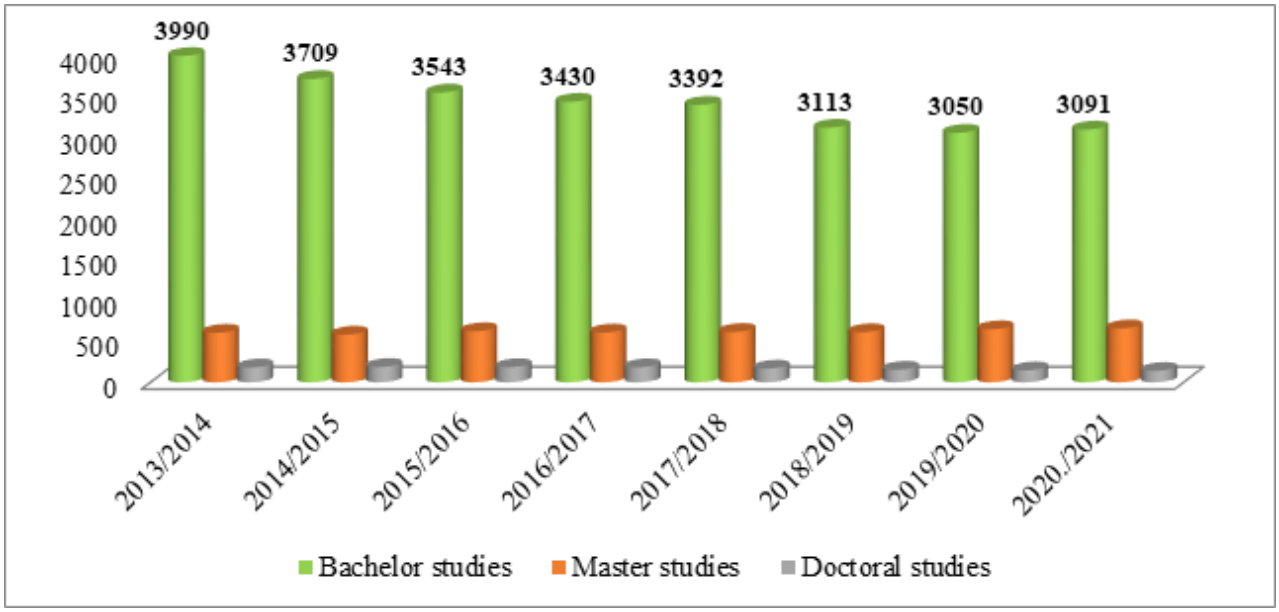


Figure 1.1.2. **The number of bachelor, master, and doctoral students in the period from 2013/2014 till 2020/2021**

The analysis of changes in the number of students distributed by the level of studies allows concluding that the numbers of undergraduate students were the most volatile (a negative trend). Notwithstanding, the number of master students shows an increasing tendency. The decrease in the number of doctoral students could be explained by the insufficient amount of funding allocated to science and research as well as the fragmented nature of that funding.

Main activities implemented by LLU to increase its number of students:

1. In the academic year 2015/2016, LLU began admitting international students for studying in English. Thus 161 international students studied at LLU in 11 study programmes (at all levels of studies) in the academic year 2020/2021.
2. Infrastructure for studies and research has been improved and modernised.
3. Opportunities to receive scholarships funded by patrons tend to increase.
4. LLU provides doctoral students with internal research grants.

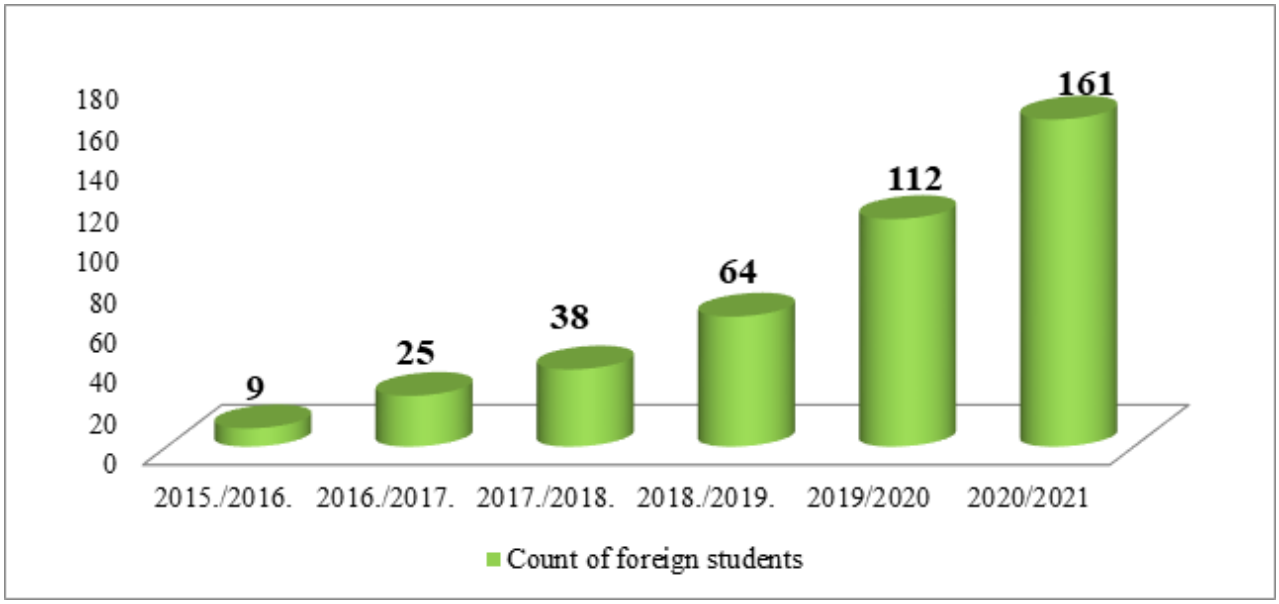


Figure 1.1.3. **The number of foreign students at LLU**

Totally, LLU offers 11 study programmes (at all levels of studies) for studying in English.

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

The following collegial institutions are involved in making **strategic decisions** at LLU:

The **Council** is a supreme collegial representation, management and decision-making body for academic and scientific matters authorised by the personnel of LLU.

The **Council**:

- approves and amends the Constitution of LLU;
- elects and dismisses the members of the Senate of LLU;
- elects and dismisses the rector of LLU;
- elects the Academic Arbitration Court of LLU and dismisses its members;
- hears reports by the Senate, the Rector and the Academic Arbitration Court;
- approves and amends regulations on electing the Council, electing and dismissing the Rector and the statutes of the Senate and the Academic Arbitration Court;
- discusses and makes decisions on conceptual matters on the performance and development of LLU.

The Council is composed of 240 members who are elected by the organisational units of LLU by secret ballot for three-year terms in the following composition:

- 160 academic staff (67%);
- 50 students (21%);
- 30 other personnel (13%).

The Council functions in accordance with its Statute - https://www.llu.lv/lv/konvents (*in Latvian*)

The **Senate** is collegial management and decision-making body of the personnel of LLU, which approves the rules and regulations that govern all the spheres of LLU activity, with the exception of those that fall within the remit of the Council in accordance with the Constitution of LLU.

The Senate is approved by the Council for a period of three years. The Senate consists of 60 senators, of which:

- 41 are representatives of academic staff who represent all the Faculties (68%);
- one representative of other personnel (2%);
- the Rector of LLU, the Vice-Rectors for studies and science and the chair of the Council as representatives of academic personnel, the director and the Chancellor of LLU as representatives of other personnel (10%);
- 12 representatives of students who have been nominated by the Student Self-government (20%).

The Senate functions in accordance with its Statute - https://llu.lv/lv/senats (*in Latvian*)

Regulations, decisions and procedures in relation to the matters pertaining to the basic activity of LLU are also passed, within the scope of competence, by:

1. Rector;
2. Vice-Rectors for studies and science;

3. Chancellor;
4. Director;
5. Deans of the Faculties

*Annex 1. Main internal legal acts and regulations.*

*Annex 2. LLU Management Structure.*

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

Quality management system at the University

The quality management of study processes is part of the overall quality management system of LLU. Since 2016, the quality management system of LLU has been based on the international standard for excellence (see Investors in Excellence Standard, www.investorsinexcellence.com).

The quality management system of LLU is externally audited every two years (audits may be done by the organisations recognised by the Investors in Excellence organisation, which either grant or do not grant an Investors in Excellence certificate to the organisation audited). Such a certificate was granted to LLU both in 2016 (the first audit) and in 2018 (the repeated audit).

The quality management system of LLU is part of the overall LLU Development Strategy and covers a broad spectrum of matters. A short general description of the LLU Quality Management System and the Quality Assurance Plan is available at https://www.llu.lv/index.php/en/mission-and-vision

Quality management system in the context of studies

LLU has developed a detailed joint scheme of study processes that includes 90 major study processes, their sequence and interaction. Each of the 90 processes is described and arranged sequentially. The description contains the following parts: activities; responsible organisational units and employees; reference to the legislative or regulatory framework governing the activities. The detailed joint scheme of study processes provides a common approach to study processes across all the organisational units.

The descriptions of quality of studies at LLU are restricted access documents and are intended for internal use at LLU as well as are part of the management and strategic documents of LLU. The detailed information on the internal quality management system and its effectiveness is contained in Section 2.2 of the self-assessment report where the quality management system is described, assessed and defined in the context of a particular study direction.

The characteristics of stakeholders and their role in the development and improvement of quality assurance system.

The quality management system of LLU covers all the spheres of LLU activity. The academic staff and other personnel of LLU are involved in the quality management system. The

coordinating body of the quality management system is the Administrative Centre of LLU, which is subordinate to the Rector.

**1.4. Fill in the table on the compliance of the internal quality assurance system of the higher education institution/ college with the provisions of Section 5, Paragraph 21 of the Law on Institutions of Higher Education by providing a justification for the given statement. In addition, it is also possible to refer to the respective chapter of the Self-Assessment Report, where the provided information serves as evidence for the full compliance, partial compliance or non-compliance.**

| | | |
|---|---|---|
| 1. | The higher education institution/ college has established a policy and procedures for assuring the quality of higher education. | Complies<br>Investor in Excellence certificate issued in 2016. Detailed information is provided in Sections 1.3 and 2.1. of the report |
| 2. | A mechanism for the creation and internal approval of the study programmes of the higher education institution/ college, as well as the supervision of their performance and periodic inspection thereof has been developed. | Complies<br>New study programmes are developed in accordance with the Regulation on Study programme Development, Approval and Amendment at LLU (No. 10-5 as of 13 March 2019) approved by the Senate.<br>The Regulation stipulates that:<br>1. A programme shall be developed by a Faculty, discussed by the Methodological Commission of the Faculty and approved by the Board of the Faculty;<br>2. The programme developed shall be discussed by the Board of Studies and recommended for approval by the Senate;<br>3. The Senate shall approve the programme and a director for the programme;<br>4. Relevant documents shall be submitted to the Academic Information Centre for being licensed;<br>5. New students shall be admitted to LLU and enrolled in the programme after the licence has been granted.<br>Every year, annual reports are drawn up for all study programmes; the reports are approved by the Senate and published on the LLU website https://www.llu.lv/lv/studiju-virzienu-parskati-un-pasnovertejuma-zinojumi (in Latvian) |

| | | |
|---|---|---|
| 3. | The criteria, conditions, and procedures for the evaluation of students' results, which enable reassurance of the achievement of the intended learning outcomes, have been developed and made public. | Complies<br><br>The students' learning outcome assessment system is described in:<br>• Regulation of Studies (bachelor's and master's degree studies).<br>• Regulation of Doctoral Studies.<br>The requirements for assessing students' learning outcomes for each particular course are given in the descriptions of study course programmes available in Latvian and English in the LLU IS course register https://lais.llu.lv/pls/pub/kursi.startup?l=2 |
| 4. | Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed. | Complies<br><br>LLU has developed procedures and regulations (approved by the Senate) to guarantee the qualifications and work quality of academic staff:<br>1. The LLU Regulations on Academic Positions - https://www.llu.lv/sites/default/files/2021-06/Akad_amati_2021_0.pdf (in Latvian).<br>2. The Regulation regarding the Calculation of Academic Workload (see in the Annex LLU Documents in English).<br>3. The Motivation System for LLU Academic Staff (see in the Annex LLU Documents in English).<br>4. Classes for students are scheduled in accordance with the procedures approved by the Rector: classes are scheduled in a centralised way for full-time studies, while for part-time studies it is done by each Faculty. The schedules are publicly available two weeks before the beginning of a semester - https://www.llu.lv/lv/nodarbibu-grafiki (in Latvian). |

| | | |
|---|---|---|
| 5. | The higher education institution/ college ensures the collection and analysis of the information on the study achievements of the students, employment of the graduates, satisfaction of the students with the study programme, efficiency of the work of the academic staff, the study funds available, and the disbursements thereof, as well as the key performance indicators of the higher education institution/ college. | Complies<br><br>LLU uses an information system that aggregates information about the entire study process of each student (decisions regarding the student, grades earned, payments made). Every semester, a survey of students is conducted to find out students' opinion regarding the courses taken, satisfaction with the way the courses are organised, the content of the courses, the teaching staff delivering the courses (an electronic questionnaire). The survey results are available to each teaching staff member, directors of study programmes, department/institute directors, deans of the Faculties and the Vice-Rector for studies. For financial planning and accounting, LLU employs the accounting system Horizon that is a single system connected with the Ministry of Agriculture. The achievement of the goals and targets set by the LLU Development Strategy is reported each year at different levels: Faculties – at the Board of the Faculty; Administrative units – at the Board of Studies; The Vice-Rectors, the Chancellor and the LLU Director – during the Rectorate meetings; The Rector – during the Council meetings. |
| 6. | The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study direction whilst implementing their quality assurance systems. | Complies<br><br>Reports of the study directions are produced every year, reviewed by the Board of Studies and approved by the Senate. Once approved, the reports are made public on the LLU website https://www.llu.lv/lv/studiju-virzienu-parskati-un-pasnovertejuma-zinojumi (in Latvian). |

# II - Description of the Study Direction (1. Management of the Study Direction)

**1.1. Economic and/or social grounds for the creation of the study direction and the relevant study programmes, the assessment of the interrelation among the study programmes, as well as the analysis of the significance (singularity) of the study programmes in comparison with other similar study programmes in Latvia and abroad.**

The economic and social substantiation of the study programmes included in the direction of study "Production and Processing" is determined by the strategic documents of Latvia and the European Union.

The hierarchically highest medium-term planning document at the national level is the "National Development Plan 2014-2020"

(https://likumi.lv/ta/id/253919-par-latvijas-nacionalo-attistibas-planu-2014--2020-gadam - *in Latvian*), in which one of the priorities is *The growth of the National Economy* with action fields *High-yielding and export-orientated production and internationally competitive services* and *Developed research, innovation, and higher education*; and "National Development Plan 2021-2027" (https://likumi.lv/ta/id/ 315879-par-latvijas-nacionalo attistibas-planu-20212027-vuotta-nap2027 – *in Latvian*), in which one of the priorities is *Knowledge and skills for personal and national growth* with the action field *Science for the development of society, economic growth, and security* and their implementation is not possible without highly educated professionals.

The European Union's Sustainable Growth Strategy Europe 2020 *Strategy for smart, sustainable and inclusive growth* (https://op.europa.eu/en/publication-detail/-/publication/6a915e39-0aab-491c-8881-147ec91fe88a/language-en), the priorities of which are the development of knowledge and innovation-based economy, the provision of a resource-efficient, environmentally safe, and competitive economy, and the promotion of employment.

These documents determine the topicality, development, and further progress of the study field programmes.

In Cabinet Order of the Republic of Latvia No. 746/2017 "On the priority fields in science in 2018-2021" (https://likumi.lv/ta/id/295821-par-prioritarajiem-virzieniem-zinatne-2018-2021-gada - *in Latvian*) among the determined priority directions of science are *Technologies, materials, and engineering systems for increasing the added value of products and processes and cyber security* and *Research and sustainable use of local natural resources for the development of a knowledge-based bioeconomy*, emphasising the importance and relevance of research in this field of study.

LLU, in cooperation with scientific institutes (Institute of Horticulture, Institute of Agricultural Resources and Economics, etc.), founded the Strategic Association of Bioeconomic Research on 24 September 2014, the aim of which was to develop and implement a science development strategy for Latvia in the field of bioeconomy, increasing the performance and competitiveness of bioeconomy sectors nationally and internationally and Latvia's contribution to EU common goals. Lecturers and researchers of the study field participated in the working group of the Latvian Bioeconomic Strategy 2030 development (https://www.llu.lv/sites/default/files/2018-07/Bioeconomy_Strategy_Latvia_LV.pdf - *in Latvian*). Achieving the goals set in the strategy requires the involvement of all sectors and this principle is integrated in the performance of the study field and related research.

The above documents determine the need for interdisciplinary knowledge, which is the basis of the study direction.

The study direction includes eight programmes that provide a full study cycle. Undergraduate study programmes are designed to offer a choice of academic or professional study programmes, whereas master's and doctoral studies only offer academic programmes.

The study programmes offered in the study direction - the academic bachelor's study programme "Food Quality and Innovations", the professional bachelor's study programme "Wood Processing", the 2nd level professional higher education study programme "Food Technology", the academic master's study programme "Food Science" and the academic master's study programme "Wood Materials and Technology", the doctoral study programme "Food Science", and the doctoral study programme "Wood Materials and Technology" - are only offered at the Latvia University of Life Sciences and Technologies. The 1st level professional higher education programme in the similar field of food technology can be obtained at Riga Technical University (RTU) Olaines Mechanics and Technology College and Rezekne Academy of Technologies, 1st level professional higher education

in wood processing can be obtained at Riga Technical College, in the field of design, studies are offered by Riga Technical University (professional bachelor's study programmes) and Rezekne Academy of Technologies (1st level professional higher education programme). Comparing the programmes offered by RTU with the professional bachelor's study programme "Design and Crafts" (LLU offered programme in the study direction), the LLU programme integrates textile, wood, and material technologies (RTU separates clothing and textile technologies from material technologies and design), places great emphasis on developing creative abilities and implementing own business, elaborating craft skills.

The comparison of the study programmes included in the study direction with similar programmes implemented abroad is given below.

**The 2nd level professional higher education study programme "Food Technology"** is designed to prepare the specialists of the highest level for the food industry - food and beverage technologists - with comprehensive technological and engineering skills necessary for professional activities, able to integrate theoretical knowledge to improve production technology, ensure the quality of food products, able to independently acquire the necessary practical skills in a specific field of food industry, and to continue studies in master's degree programmes. The study programme is compared with the bachelor's study programme in *Food Science and Technology at Wageningen University a*nd the bachelor's study programme in *Food Technology/Food Technology* + at *the University of Applied Sciences* (Fulda, Germany).

**Common**: all study programmes have a common goal and similar learning outcomes, similar study courses, opportunities to continue studies for master's programmes.

**Different:** duration of studies in all higher education institutions, respectively, amount of CP, different final examination - development and defence of bachelor's thesis at Wageningen University and the University of Applied Sciences (Fulda), diploma project (LLU), internships and their duration also are different. LLU offers part-time studies. Engineering courses have a larger share in the LLU programme, because the field of work of a food technologist is related to technological equipment, mastering their operation. LLU has a larger volume of general education study courses and the programme is more labour market-orientated.

**The academic bachelor's study programme "Food Quality and Innovations"** is designed to prepare a competitive and knowledgeable professional in the field of food quality and innovation, able to organise quality management and innovation development in food companies, perform creative research, and form the basis for further higher education studies. The study programme is compared with the bachelor's study programme in *Food Science and Technology at Wageningen University* and the bachelor's study programme in *Engineering and Management: Food Innovation* at *the University of Applied Sciences (Fulda, Germany).*

**Common:** the programme is implemented in English, and there are similar study courses that are implemented differently; a bachelor's thesis is developed.

**Different:** the volume of the study programme and the duration of implementation in each higher education institution differs: 4 years (LLU), 3 years (Wageningen), 3.5 years (Germany), the number of study courses is different. LLU has a larger volume of general education study courses.

**The professional bachelor's study programme "Design and Crafts"** has been created with the aim to develop and make effective use of one's creativity, to acquire technologies and marketing opportunities in order to be able to create innovative and practical products that improve the quality of life of consumers. The programme is compared to two *Tallinn University* bachelor's study programmes *Integrated craft and home economics* and *Handicraft technology and design*.

**Common:** the programmes are implemented in the state language, the final work is a bachelor's thesis, a similar aim of the study programme and textile, wood, and material technology courses included in the study course plan.

**Different:** volume of the study programmes and implementation time, offered elective study courses. LLU also offers part-time studies. LLU has a larger volume of general education study courses.

**The professional bachelor study programme "Wood Processing"** is designed to provide students with fundamental and theoretical knowledge to prepare comprehensively trained specialists for research and practical work, able to manage wood processing and resources in companies of various types and sizes or hold leading positions in private companies and public institutions. The study programme is compared with the professional study programme *Wood Processing Technology of the Estonian University of Life Sciences* and the bachelor's study programme *Wood Technology of the Rosenheim Technical University of Applied Sciences* (Germany).

**Common:** the programmes are implemented in the state language and have similar programme curricula and the study plan.

**Different:** the amount and duration of studies are different; LLU also offers part-time studies, final works are different (bachelor's thesis or diploma project), the amount of final works in CP is different. LLU has a larger volume of general education study courses.

**The academic master's study programme "Food Science"** is designed to prepare creative, decision-making top-level specialists for the development and competitiveness of food and beverage technology field and production in Latvia and the European Union, providing them with comprehensive knowledge in food production and research skills for scientific and academic work. The study programme is compared with the *Wageningen University* master's study programme *Food Technology* and *the University of Helsinki* master's study programme *Food Science.*

**Common:** the volume of the study programme is 120 ECTS, study courses have a similar content, languages of implementation (in the state language and English, only English at Wageningen University), and final work - master's thesis.

**Different:** the number of study courses, the depth of topics is different at the universities of Wageningen and Helsinki, there are nuances in the awarded degree of food science (at the University of Wageningen and the University of Helsinki) and in food and beverage technology at the LLU.

**The academic master's study programme "Wood Materials and Technology"** is designed to prepare highly qualified specialists who are endowed with creative and independent decision-making skills and the ability to promote further development of the industry through scientific, pedagogical, and professional activities. The study programme is compared with the master's programme in *Forest Industry of the Estonian University of Life Sciences* and the master's programme in *Wood Technology at the Rosenheim Technical University of Applied Sciences* (Germany).

**Common:** Latvian and Estonian programmes have a common scope and implementation time, final work - master's thesis, similar programme goals.

**Different:** the time and scope of programme implementation differs from the German university, the amount of CP for the development of a master's thesis is different, the amount for internship and research work is different.

***The doctoral study programme "Wood Materials and Technology"*** has been designed with the aim to prepare highly qualified scientists for sub-sector of Material sciences - Wood materials and technologies, thus stimulating the development of the engineering industry of wood materials and technologies, and to prepare high quality new generation of scientists of international level. The study programme has been compared with the doctoral programme *in Forestry of the Estonian University of Life Sciences* and the doctoral study programme *Sustainable use of renewable natural resources* of *the University of Helsinki*.

**Common:** the aim of the study programme, implementation of the programme in the state language.

**Different:** scope and duration of the programme, awarded qualifications: in Estonia, a Ph.D in forestry, in Finland a Ph.D in agriculture and forestry, in Latvia a Ph.D in wood materials and technologies, in Finland and Estonia the programme is also implemented in English, LLU has a larger amount of theoretical studies.

**The doctoral study programme "Food Science"** has been designed with the aim of training qualified specialists for study and research work with competence complying with international standards in solving problems in the field of food and beverage technology sciences. The programme is compared with the *Wageningen University* doctoral programme and the *Brno University of Technology* doctoral study programme *Chemistry and Technology of Foodstuffs*.

**Common**: aim of the programme and method of implementation.

**Different:** the volume and duration of implementation of the study programme, awarded degree in the field (in Latvia - a Ph.D in food and beverage technology, in Wageningen - a Ph.D, in the Czech Republic - a Ph.D in chemistry and technology of foodstuffs). The doctoral thesis is developed as a set of publications (Wageningen, the Czech Republic, in LLU more often as a monograph). Larger amount of theoretical courses in Latvia.

### 1.2. Aims of the study direction and their compliance with the scope of activities of the higher education institution/ college, the strategic development directions, as well as the needs and the development trends of the society and the national economy.

The study direction "Production and Processing" is one of the priority study fields at the LLU, the basic direction of the STEM (Science, Technology, Engineering, Mathematics) field. The aim of the study direction is high-quality studies that ensure the preparation of internationally competitive specialists in the field of foodstuffs, wood processing, and design. The aim of the study direction is based on the vision and mission of the LLU, the assessment of future opportunities and challenges, the long-term development goals of the LLU - excellence in research that promotes technologies and innovations and is integrated into the study process; high-quality studies, preparing internationally competitive specialists (https://www.llu.lv/en/mission-and-vision).

The implementation of the goal of the direction promotes the training of competitive intellectual potential, especially for the food and wood industry, which are the areas of the Latvian Smart Specialisation Strategy. In addition, the most important aspects in achieving the goal are the integration of studies and research, the provision, creation, and maintenance of a modern study and research environment, quality, and the linking of the interests of the parties involved.

The significance of the study programmes included in the study direction for the development of

the national economy and society is determined by:

1. Uniqueness of the study programmes - provide knowledge, skills, and competencies relevant for the labour market.
2. Provision of full-cycle studies (undergraduate studies (bachelor's and professional), master's, and doctoral) - allows one to acquire the necessary skills and competencies for professional activity and research.
3. Food production, wood processing, wood materials and technologies are knowledge-intensive areas of the bioeconomy and smart materials, technologies, and engineering systems that include the full use of natural resources and the development of production through research-based technological innovation, increasing sectoral productivity, resource efficiency and competitiveness at the national and international level, also contributing to the improvement and modernisation of technological capabilities, the use of more energy-efficient and environmentally friendly technologies in industrial processes, energy, construction, agriculture, promoting long-term sustainable development.
4. Design and craft study programme is able to develop creativity through mastering technologies and marketing opportunities to create innovative and practical products that improve the quality of life of consumers.

The aim of the study direction is closely related to the Latvian and European Union forecasts for graduates in this field in the labour market. The report of the Ministry of Economics “Informative report on medium and long-term labour market forecasts” (https://www.em.gov.lv/lv/media/598/download - *in Latvian*) indicates that the number of employees in the food and wood processing sector will increase (contrary to EU trends), including significant productivity gains in the sectors. This is in line with the constant demand for knowledge in material sciences, electrical engineering, food biotechnology. Recognising the fact that the European Commission has identified specialisation in high-tech and knowledge-intensive areas as one of the main advantages of EU competitiveness in global markets, it identifies the need for the expertise and skills that underpin the programmes in this direction of study.

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

The strengths and weaknesses, opportunities and threats of the study direction are assessed on the basis of the economic and social situation in Latvia. The development perspective of the study direction is determined by the labour market forecasts and also the strategic direction (priority) “Knowledge and skills for personal and national growth” defined in the state long-and medium-term planning documents. In addition, analysing the requirements for strengthening Latvia's competitive position in global markets, the main challenges/importance for future growth are qualitative improvements in the labour market that would respond to the main economic development challenges - demography, rising labour costs, matching skill supply and demand. This is the justification for the implementation of the study programmes of the study direction and the basis

for the strength and further development of the study direction.

Table 1.3.1.

**SWOT matrix of the study direction**

| | |
|---|---|
| ***Strengths of the study direction*** | ***Weaknesses of the study direction*** |
| The only higher education institution in Latvia that educates bachelor's, master's and science doctors (Ph.D) in food and beverage technology, wood processing and wood materials and technology, as well as food and beverage technologists<br>Graduates have good career opportunities in the labour market<br>Qualification, experience, and scientific competence of the academic staff<br>Material and methodological provision of the study process<br>State-funded study places<br>Recognisability and reputation of the University<br>Ensuring the succession of studies - bachelor's or professional/master's/doctoral studies<br>Research-based study process<br>Student/teaching staff mobility<br>Positive evaluation of studies by students, graduates, and employers<br>Involvement of students in research | Significant reduction in the number of students in the first years of studies (undergraduate studies) due to the different level of preparation of the applicants and the inability to study independently<br>Insufficient financial support of the study field does not motivate new specialists to be attracted |
| ***Opportunities of the study direction*** | ***Threats of the study direction*** |
| Involvement of industry professionals in the study process<br>Creation of scholarships provided by the companies in the sector<br>Attracting foreign students<br>Attracting foreign lecturers<br>Development of joint study programmes (with foreign partners)<br>Employment of master's and doctoral students in the implementation of the study process | Demographic situation in the country<br>Decrease in the number of potential students<br>Decline in material well-being of students' families |

The development plan of the study directionis closely related to the development strategy of the LLU and the policy documents of the sector, as well as to the study programme plans included in the direction (see the Annex *Development plan of the study direction*).

The main development priorities of the study direction are:

1) improvement of study curricula, environment, and infrastructure;

2) implementation of study programmes in English, attraction of foreign students, and popularisation of study programmes;

3) more targeted attraction of foreign lecturers;

4) promotion of the mobility of students/teaching staff;

5) closer cooperation with foreign partner universities for the implementation of joint programmes.

The study direction plan for the elimination of weaknesses is the implementation of levelling courses (mathematics, physics, chemistry). Courses organised by the Lifelong Learning Centre to strengthen knowledge of chemistry, physics, and mathematics. Activation of students-mentors, assistant for newcomer students. Support for new lecturers, involvement in the implementation of research projects, etc.

The study direction plan for threat prevention is industry support for the popularisation of study programmes, expansion of scholarship programmes, state support instruments for students' families.

The study direction plan for the exercise of opportunities is the implementation of study programmes in a foreign language. This would increase the number of students in the programmes. Currently, only 2 study programmes have been granted the right to provide studies in English. Pursuant to the accreditation procedure, this right was also requested for the doctoral study programme “Food Science”. With the help of various projects, find an opportunity to attract foreign lecturers and doctoral students and/or candidates for a scientific degree. Considering the competencies of the implementers of the field, as well as the importance of the food and wood industry in the national economy, there are opportunities to create joint master's/doctoral study programmes with the implementers of similar study fields in Lithuania and Estonia.

**1.4. The structure of the management of the study direction and the relevant study programmes, and the analysis and assessment of the efficiency thereof, including the assessment of the role of the director of the study direction and the heads of the study programmes, their responsibilities, and the cooperation with other heads of the study programmes, as well as the assessment of the support by the administrative and technical staff of the higher education institution/ college provided within the study direction.**

The study direction is a part of the general structure of the LLU. The Faculty of Food Technology (PTF), Forest Faculty (MF) and the Faculty of Engineering (TF) are responsible for the implementation of the study direction, but the Faculty of Information Technologies, the Faculty of Environment and Civil Engineering, the Faculty of Economics and Social Development, Language Centre, Sports Centre and the Training and Research farm *Vecauce*, the Forest and Wood Products Research and Development Institute are involved in the realisation of the study direction programmes. The study direction includes eight study programmes.

The academic staff of the Faculty of Food Technology, Forest Faculty and the Faculty of Engineering are involved in ensuring the operation of the study direction: deans, vice-deans, study programmes’ directors, and the heads of departments/institutes, teaching staff and LLU Student Government (also Student Government of Faculties). The dean’s office supervises the students' files, arranges the record-keeping, and prepares the diploma supplements.

The director of the programme is responsible for the implementation of the study programme in accordance with the Senate decision No 9-81 (13 April 2017) “Regulations on study programme directors”, which defines the duties and rights of the director. The director of the study programme is approved by the LLU Senate on the basis of the decision of the LLU Board of Studies. The duties of the study programme director are:

1) to organize the development of the study programme;

2) to prepare information for the annual self-assessment report of the study programme and for the accreditation report;

3) to co-operate with the dean of the faculty, heads of departments/institutes, teaching staff and students in the improvement of the study programme;

4) to follow the evaluation of the teaching staff involved in the study programme at LLU IS and to evaluate them;

5) to analyse the results of the conducted surveys and to propose the elimination of the revealed shortcomings;

6) to perform academic recognition of the study courses or parts thereof;

7) to inform students about current processes, activities and requirements in studies, to cooperate with LLU Studies Centre and Communication and Marketing Centre.

The study programme director prepares information for the annual self-assessment report of the study programme, and the responsible person (every year the responsibility is delegated to one of the study direction implementers) prepares the annual self-assessment report of the study direction. The internal documents of the LLU regulate the preparation of study direction reports (the person responsible for the preparation of study direction report is determined by the Vice-rector for Studies Order No. 2.4-8 / 66 of 6 October 2020 "On the procedure for preparation of annual study direction report and self-assessment report") and the report is approved by the Boards of PTF, MF and TF.

The study programme directors and the dean are involved in the work of the Faculty's Methodological Commission (Decision No. 6-17 of the LLU Senate of April 9, 2008 "Regulations of the Methodological Commission"), thus establishing cooperation in evaluating and coordinating study programmes implemented at the faculty.

The organization of the study programme is conducted taking into account the needs of students in the study process, regularly evaluating and analysing the performance. The study work is organized by faculties and their departments but supervised by the Boards of PTF, MF, TF, Studies Centre, LLU Boards and Senate.

The efficiency of management at LLU is promoted by the unified procedures in the study organization in all study directions and programmes, unified document samples and availability of information on ongoing processes and current events, regular meetings with management, deans, supporting administrative units. See the scheme of the management structure in the Annex *The structure of the management of the study direction Production and Processing*.

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

The admission procedure and requirements for students are determined by the *Admission Regulations*. Admission Regulations for all LLU study programmes, including those included in the

study direction “Production and Processing”, are approved by the Senate in October every year and published in the LLU portal. Admission Regulations *in Latvian* are available at https://www.llu.lv/lv/uznemsana, for studies *in English* - https://www.llu.lv/en/degree-programmes.

Applicants for undergraduate, master's and doctoral studies are admitted on a competitive basis, in accordance with the competition criteria specified in the Admission Regulations.

Admission Regulations for students studying *in Latvian* (https://www.llu.lv/sites/default/files/2020-10/Uznemsanas_noteikumi_pamatstudijas_2021_2022.pdf ) and foreign students *in English* (https://www.llu.lv/en/degree-programmes).

Academic bachelor’s study programme *Food Quality and Innovations* admission requirements - **General Secondary Education or Professional Secondary Education**. Students are admitted on a competitive basis based on a centralised examination in Latvian, foreign language, mathematics, chemistry or a certificate/diploma final year grade in chemistry or natural sciences. Additional points are awarded for the centralised examination in biology.

Admission Requirements for the 2nd level professional higher education study programme *Food Technology* **- General Secondary Education or Professional Secondary Education**. Students are admitted on a competitive basis based on a centralised examination in Latvian, foreign language, mathematics, chemistry or a certificate/diploma final year grade in chemistry or natural sciences. Additional points are awarded for the centralised examination in biology.

Admission requirements for the professional bachelor's study programme *Design and Crafts* **- General Secondary Education or Professional Secondary Education**. Students are admitted on a competitive basis based on a centralised examination in Latvian, foreign language, and mathematics. Additional points are awarded for the centralised examination in physics.

Admission requirements for the professional bachelor's study programme *Wood Processing* **- General Secondary Education or Professional Secondary Education**. Students are admitted on a competitive basis based on a centralised examination in Latvian, foreign language, and mathematics. Additional points are awarded for the centralised examination in physics.

Applicants for undergraduate studies can apply for the chosen study programme in the unified admission system (implemented by 12 Latvian higher education institutions (Latvia University of Life Sciences and Technologies, the University of Latvia, Riga Technical University, Daugavpils University, Liepaja University, Vidzeme University of Applied Sciences, Rezekne Academy of Technologies, Ventspils University of Applied Sciences, BA School of Business and Finance, EKA University of Applied Sciences, RISEBA University of Applied Sciences, ISMA University of Applied Sciences), using e-service (portal https://latvija.lv/ - *in Latvian*). The unified system offers several advantages:

- for higher education institutions - to forecast the number of potential students who will enter into a study agreement;
- for applicants - to approve the application for studies closer to their place of residence, to follow their opportunities to study in the chosen study programme, to promptly receive the results of the competition.

Admission requirements for the academic master's study programme *Food Science* **- bachelor's degree or 2nd level professional higher education** in food technology. Graduates of the undergraduate study programmes “Food Science”, “Food Quality and Innovations”, and “Food Technology” receive 2 additional points in the competition.

Admission requirements for the academic master's study programme *Wood Materials and Technology* - **bachelor's degree or 2nd level professional higher education** in wood

processing, forest industry, construction, architecture, and design. Graduates of the professional bachelor's study programme "Wood Processing" receive 2 additional points in the competition.

Candidates are admitted on a competitive basis on the basis of a weighted average mark obtained in a bachelor's or higher professional education studies. LLU graduates can apply for master's studies electronically, using the LLU Information System, graduates of other universities - in person at LLU.

Admission requirements for the doctoral programme *Food Science* **- master's degree** in engineering sciences or equivalent education in food and beverage technologies. If the academic or professional master's degree has been obtained in another field of science, the prospective doctoral student must pass an entrance examination in the field of food and beverage technology relevant to the chosen theme of the dissertation.

Admission requirements for the doctoral programme *Wood Materials and Technology* **- master's degree** in engineering sciences in wood materials and technology sub-branch or related science sub-branch. If the academic or professional master's degree has been obtained in another field of science, the prospective doctoral student must pass an entrance examination in the field, relevant to the chosen theme of the dissertation.

Prospective students in the undergraduate study programmes of the study direction can also start studies in later study stages, if they have previously acquired knowledge, skills, and competencies in formal education (Rector's decree) or in non-formal education (https://www.mc.llu.lv/sites/default/files/2021-04/LLU_%C4%80rpus%20form%C4%81l%C4%81s%20izgl%C4%ABt%C4%ABbas%20un%20profession%C4%81l%C4%81s%20experience%20equalize%C5%A1anas%20nolikums.pdf - *in Latvian*). LLU has approved regulations and procedures for starting studies in later study stages and for the recognition of knowledge, skills, and competencies acquired outside formal education or through professional experience. Recognition of competencies acquired outside formal education or acquired through professional experience and study results achieved in previous education at the Latvia University of Life Sciences and Technologies is carried out pursuant to Articles 59.2 and 59.3 of the Law on Higher Education Institutions and Cabinet Regulation No. 505/2018 "Regulations on the Recognition of Knowledge, Skills, and Competences Acquired Outside Formal Education or Acquired through Professional Experience".

Table 1.5.1. summarises the statistics on initiating studies at later stages.

Table 1.5.1.

**Starting studies in later stages**

| Study programme | 2012/2013 | 2013/2014 | 2014/2015 | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
|---|---|---|---|---|---|---|---|---|
| *Wood Processing* | 5 | 3 | 3 | 3 | 5 | 6 | 3 | 3 |
| *Food Technology* | 13 | 17 | 13 | 12 | 4 | 11 | 4 | 5 |
| *Food Quality and Innovations* | - | - | - | - | - | - | 1 | - |

## 1.6. Assessment of the methods and procedures for the evaluation of students'

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

The basic principles of student knowledge evaluation are determined by Cabinet Regulation No. 240/2016 “Regulations on the state academic education standard”, Cabinet Regulation No. 512/2014 “Regulations on the second level professional higher education state standard”, and LLU internal regulatory enactments, e.g., the Study Regulations. Criteria, conditions, and binding procedures for assessing student grades are described in the Study Regulations, see https://www.llu.lv/sites/default/files/2021-05/Studiju_nolikums_2021.pdf (*in Latvian*). The basic principles of assessment are based on the study results in the study programme.

Basic principles of student performance evaluation:

1) the principle of openness - a set of requirements for study courses is defined, the quality of knowledge is assessed qualitatively (on a 10-point scale) and quantitatively (in credit points);

2) the principle of obligation - it is required to obtain a successful assessment in all study programme courses;

3) the principle of assessment review - LLU determines the procedure for reviewing the obtained assessment;

4) the principle of diversity of the types of assessment - see different types of tests used in the assessment of study programme acquisition in the descriptions of study courses.

Knowledge, skills, and competencies are defined in the study course programmes; their assessment is also indicated in the requirements for obtaining credit points and the organisation of students' independent work. At the beginning of the study course, the lecturers also acquaint the students with the objective of the study course, tests, organisation of independent work and the procedure and terms of implementations, as well as the evaluation criteria. This information is also included in e-studies for the respective course.

The lecturer chooses the study course evaluation methods, evaluating the specifics of the study course, the level of students' preparation, and the previously acquired study courses. The types of examination are collegially discussed for the effectiveness of the implementation of study programme.

The analysis of students' success is evaluated twice a year, at the end of each semester. The Study Regulations stipulate the procedure for the implementation of studies in the case of academic debts.

LLU has developed the principles of evaluation of final works; it is determined by the “Regulations on final examinations” (approved by the decision of the LLU Senate) and its subordinate Rector’s and Vice-rector's decrees, methodological instructions for final thesis, Methodological instructions for the development and defence of final works drawn up at the Faculty of Food Technology, the Forest Faculty, and the Faculty of Engineering. The procedure for the evaluation of final works is described in the study course descriptions *Bachelor's Thesis*, *Diploma Project*, *Master's Thesis*. One month before the handover of the final works, a preliminary defence of the works is organised, in which the development progress and the degree of work readiness are assessed. The final work is defended at the Sessions of the State Examination Commission (bachelor's theses, diploma works/diploma projects), and the Master's Examination Commission, its evaluation (with a mark) is

formed from the thesis reviewer's and the commission's evaluation.

In the evaluation of the internship, the LLU Internship Regulations approved by the Senate of the LLU and the subordinate decrees, the regulations developed by the faculties for the implementation of the internship are observed. Students' achievements are evaluated according to the aim and tasks of the internship. The evaluation of the internship consists of the report prepared and submitted to the internship supervisor with the evaluation of the internship supervisor (company), and the public presentation of the internship report before the commission set by the internship supervisor from the LLU. The evaluation of the internship is stipulated in the Internship Regulations and the Faculty Methodological Regulations of the Internships.

The evaluation of the doctoral thesis is determined by Cabinet Regulation No. 1001/2005 "Procedure and Criteria for Awarding a Doctoral Degree" (https://likumi.lv/doc.php?id=124787 - *in Latvian*). Doctoral studies finish with the passing of doctoral examinations and submission of the prepared doctoral thesis to the respective Promotion Council, fulfilling the procedures specified for the defence of the doctoral thesis and public defence of the thesis (see https://www.llu.lv/lv/promocijas-kartiba - *in Latvia*).

The defined principles, criteria, and procedures for evaluating student performance promote the achievement of the goal of the study programme and ensure the implementation of student-centred learning.

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

Academic integrity is the exercise of academic work with the highest standards of professionalism and accuracy, objectivity and truthfulness, moral and ethical principles, integrity, including the prevention of plagiarism, truthful reporting and accuracy in academic publications, and in communication and publicity activities.

The task of academic integrity of the University is:

1) to observe a high academic and scientific culture;

2) to promote public confidence in the quality of education and the results of scientific research;

3) to prevent and eliminate violations of the principles of operation of academic integrity;

4) to determine liability for dishonest and unauthorised actions.

Students and LLU academic, general, scientific, and administrative staff are equally responsible for the observance of the principles of academic integrity and for the consequences of violation.

LLU has developed and follows certain procedures for the control of plagiarism in the final works and actions, if plagiarism is confirmed:

1) the Rector's decree "Procedures for submitting electronic copies of final works and their verification in the plagiarism control system";

2) Rector's decree "Violations of academic integrity in final works/doctoral theses".

In 2014, LLU concluded an agreement on the use of the inter-university unified computerised plagiarism control system and started the examination of all final works for plagiarism in undergraduate studies and master's studies and starting with the 2017/2018 study year - also in doctoral studies.

The procedure provides that if in the final work the system finds a 10% coincidence of the text with another work, the Methodological Commission or the Promotion Council of the Faculty of Food Technology or Forestry, or Engineering decides on the presence or absence of plagiarism in the work. When making a decision, the explanations of the author of the work and its supervisor are considered.

In the period from 2014 to 2020, 582 works have been examined in the study direction "Production and Processing". Of these, 2 works were recognised as plagiarism. Evaluating the detected plagiarism, students were given the right to redo and resubmit the work. During the reporting period, no students have been suspended from the final examination.

**1.8. Specify the websites (e.g. the homepage) on which the information on the study direction and the relevant study programmes is published (in all languages in which the study programmes are implemented) by indicating the persons responsible for the compliance of the information available on the website with the information published in the official registers.**

Information about the study programmes of the study direction "Production and Processing" is published in the LLU portal (https://www.llu.lv/lv/studiju-programmas - *in Latvian*), providing basic information about the programmes, including current events. A detailed description of the study programme is available in the section *Studies/Study programmes*, see the detailed information of the study programme - https://www.llu.lv/lv/pamatstudijas/dizains-un-amatnieciba - *in Latvian* (Design and crafts), https: //www.llu. en / en / basic studies / wood processing - *in Latvian* (Wood Processing), https://www.llu.lv/lv/pamatstudijas/partikas-kvalitate-un-inovacijas - *in Latvian* (Food Quality and Innovations), https://www.llu.lv/lv / basic studies / food-product-technology - *in Latvian* (Food Technology), https://www.llu.lv/lv/magistra-studijas/koksnes-materiali-un-tehnologija - *in Latvian* (Wood Materials and Technology, master's studies), https: // www.llu.lv/lv/magistra-studijas/partikas-zinatne - *in Latvian* (Food Science, master's studies), https://www.llu.lv/lv/doktora-studijas/koksnes-materiali-un-tehnologijas - *in Latvian* (Wood Materials and Technology , doctoral studies), https://www.llu.lv/lv/doktora-studijas/partikas-zinatne-doktora-studijas - *in Latvian* (Food science, doctoral studies). Information about study programmes can be found in the section *Come to study/What to study? Assistant in choosing study programmes* - https://www.llu.lv/lv/nac-studet-llu (*in Latvian*).

Information **only on study programmes implemented in English** is available in the English version of the portal, see *Studies/Degree Studies/Degree programmes* - https://www.llu.lv/en/degree-programmes Bachelor's study programmes (https: // www .llu.lv / en / academic-study-program-food-quality-and-innovations), 2nd level professional study programmes, Master's study programmes (https://www.llu.lv/en/food_science) and Doctoral study programmes are individually allocated. In this direction, only 2 study programmes are implemented in English, an accreditation application has also been submitted for the doctoral study programme "Food Science".

Descriptions of study programmes are available on the website of the Faculty of Food Technology (http://www.ptf.llu.lv/lv *in Latvian*) in the section *Studies/Study opportunities*, separately allocating undergraduate studies (http://www.ptf.llu.lv/lv/pamatstudijas - *in Latvian*), master's studies (http://www.ptf.llu.lv/lv/magistra-studijas - *in Latvian*), and doctoral studies (http://www.ptf.llu.lv/lv/doktora-studijas - *in Latvian*). On the website of the Forest Faculty (http://www.mf.llu.lv/lv - in Latvian) in the section *Studies/Study opportunities,* separately allocating undergraduate studies (http://www.mf.llu.lv/lv/pamatstudijas - *in Latvian*), master's studies (http://www.mf.llu.lv/lv/magistra-studijas - *in Latvian*), and doctoral studies (http://www.mf.llu.lv/lv/doktora-studijas - in Latvian). On the website of the Faculty of Engineering (http://www.tf.llu.lv/lv - in Latvian) in the section *Studies/Study opportunities,* separately allocating undergraduate studies (http://www.tf.llu.lv/lv/pamatstudijas - *in Latvian*).

Information about study programmes is also compiled in an electronically available catalogue, as well as feedback from graduates and employers. See the catalogue of undergraduate study programmes -_https://www.llu.lv/buklets/llu-pamatstudiju-buklets-2020 (*in Latvian*) and the catalogue of master's study programmes - https://www.llu.lv/buklets/llu-magistra-studijas-buklets -2020 (in Latvian).

The structural units responsible for the compliance of the information available on the LLU portal to the official registers are:

- Studies centre - for undergraduate, master's, and doctoral study programmes;
- International Cooperation Centre - for study programmes that are implemented in English.

Information about LLU study programmes is also available in the portal www.prakse.lv (*in Latvian*) in the section *Education/Educational Institutions* - https://www.prakse.lv/edu/profile/84/latvijas-lauksaimniecibas-universitate (*in Latvian*) and in the National Database of Educational Opportunities www.niid .lv (*in Latvian*) in the section *Educational institutions* - http://niid.lv/niid_search/provider/Latvijas%20Lauksaimniec%C4%ABbas%20universit%C4%81te?qy=&ct=&tg=&level_1=7 (*in Latvian*).

The LLU portal provides information on the conditions and procedures of academic mobility in accordance with the ERASMUS + University Charter and programme guidelines:

- https://www.llu.lv/lv/stnationaliska-mobilitate *in Latvian*;
- https://www.llu.lv/en/exchange-studies *in English*.

LLU subscribes the study e-marketing sites for the popularisation of study programmes, for example, https://www.masterstudies.com/universities/Latvia/LLU/

**For foreign students**

The LLU portal provides comprehensive information for applicants and students:

- LLU study programmes offer - https://www.llu.lv/en/degree-programmes with a detailed description of the study programme, study plan, and other information. Currently, there are 2 study programmes in the direction - the academic bachelor's study programme "Food Quality and Innovations" (https://www.llu.lv/en/academic-study-programme-food-quality-and-innovations) and the academic master's study programme "Food science" (https://www.llu.lv/en/master-study-programmes) that are implemented in English.
- admission process - https://www.llu.lv/en/how-to-apply
- immigration procedure - https://www.llu.lv/en/immigration
- description of accommodation - https://www.llu.lv/en/accommodation and

https://www.llu.lv/en/practical-tips

- testimonials of foreign students and graduates - https://www.llu.lv/en/student-testimonials-7

The director of the programme and/or the external relations coordinator of the faculty is responsible for the information published in the portal (in the context of the content of the study programme), but the external relations coordinators of the International Cooperation Centre of the LLU are responsible for the placement of the information.

## II - Description of the Study Direction (2. Efficiency of the Internal Quality Assurance System)

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

The internal quality assurance system is a continuous process, the aim of which is the continuous improvement and development of the study direction and the study programmes included in it. This is confirmed by the internationally recognized certificate "Investor in Excellence" obtained by the LLU, which has been gained for the second time and currently the activities of the LLU are audited according to this certificate until 2022 (https://www.llu.lv/lv/sertifikats-investors-in-excellence - *in Latvian*).

The internal quality assurance system is based on several stages:

- plan – set goals, plans personnel, finances, time, etc. resources - the desired operational results are defined in the LLU Development Strategy 2015–2022, in the PTF, MF, TF Work Plans, LLU Enrolment Limits and Forecasts;
- do – implement the study and research process, the activities of the Faculty;
- check – control and implement performance monitoring measures (for example, analysis of the results of the implementation of the strategy);
- act – improve processes and activities, initiate changes in internal regulatory documents.

LLU study work is organized and managed in accordance with standards and guidelines for quality assurance in the European Higher Education Area. Taking into account these guidelines, internal normative documents for the study organization have been developed. Supervision of LLU activities is ensured by performing activities integrated into daily work and activities, such as coordination, approval, evaluation of work quality, division of duties and responsibilities, etc., at the same time targeted control measures are implemented throughout the year at different times.

**The indicators characterizing the quality of studies are**:

- number of matriculated students – once a year, the Studies Centre sends information to deans and study programme directors for data evaluation and statistics;
- number of students in the study programme - the Studies Centre once a month sends information to deans and study programme directors for data evaluation, analysis, and action, if necessary;
- fulfilment of the state-funded places – the Studies Centre once a month sends data to the LLU management, deans.

**The indicators characterizing the qualification and work quality of the teaching staff are:**

- students' assessment at the end of each semester: the survey is conducted electronically at LLU IS. The results of the survey are available to the directors of the study programmes, the heads of the structural units and each lecturer individually (assessment of the study course taught in the respective semester). The results of the survey and the comments provided in it give the lecturer the opportunity to evaluate and improve his / her work, provide the study programme director with insight and recommendations for improving the quality of study courses and the programme. Heads of the structural units and administration use the information obtained from the surveys to study quality improvement measures at the university level. The results of the survey are one of the criteria in the motivation system of the LLU teaching staff;
- the qualification of the teaching staff is ensured by the LLU regulations on academic positions, which confirm the compliance of the person's academic and professional qualification with the study and research work (https://www.llu.lv/lv/nolikumi - *in Latvian*);
- in order to promote the continuous professional development of the teaching staff in the didactics of the higher education institution, the professional development programme for higher education teachers “Innovations in Didactics of the Higher Education Institutions” has been established.

To monitor **the quality assurance of the study environment**, a self-assessment report of the study programme is prepared once a year, which includes information on changes in study plans and courses, development of new study courses, study materials and information resources, cooperation with stakeholders, infrastructure changes, etc.

An important part of the study quality is the provision of study materials, textbooks and resources, therefore the fund of the LLU Fundamental Library is constantly supplemented with literature recommended by the lecturers in the state language and foreign languages (mainly in English). The lecturers themselves prepare study materials, write textbooks and monographs, which are used in the study process.

The management of the Faculty constantly monitors the compliance of the study environment and material and technical provision with the needs of the study process.

In accordance with the results of quality monitoring measures, the quality of studies is reviewed and measures are taken to improve it.

**2.2. Analysis and assessment of the system and the procedures for the development and review of the study programmes by providing specific examples of the procedures for the development of new study programmes within the study direction (including the approval of study programmes), the review of the study programmes, the aims, and regularity, as well as the stakeholders and their responsibilities. Description of the mechanism for obtaining and providing a feedback, including with regard to the work with the students, graduates, and employers.**

The development of new study programmes is performed in accordance with the regulations "Regulations for the Development, Approval and Change of the Study Programmes at the LLU" approved by the Senate. The regulations stipulate that the programme is discussed and analysed in the Methodological Commission and the Board of the Faculty, and the LLU Board of Studies. The

developed programme or its changes are confirmed by the decision of the Senate.

The existing study programmes are reviewed every study year, preparing an annual report of the study direction. The reports are publicly available on the LLU portal at https://www.llu.lv/lv/studiju-virzienu-parskati-un-pasnovertejuma-zinojumi (*in Latvian*). Representatives of the Board of Faculty, Studies Centre, and LLU Board of Studies are introduced to the prepared reports and those are approved by the Senate.

In the period from 2018 to 2021, LLU implements ERDF project No. 8.2.3.0/18/A/009 "The Management Improvement of the Latvia University of Life Sciences and Technologies", within the framework of which the content analysis of study programmes was performed from the point of view of industry experts (employers) and foreign experts (professors of related fields of study). Recommendations of the industry and foreign experts have been taken into account for further improvement of the study programme, namely, the results to be achieved by the study programme have been specified, the usefulness and scope of the individual study courses have been considered, as well as higher involvement of students/ master students and doctoral students in research.

The surveys of students, graduates and employers are being conducted for the acquisition of feedback. The results of the survey can be found in Section 2.6 of the self-assessment report of each study programme. The recommendations of students, graduates and employers are discussed in the Methodological Commission of the Faculty and implemented in the study programme (see Section 2.6 of the study programmes self-assessment report).

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

Students have the right and opportunity to submit proposals, complaints about the course of the study process and the content of the study programme. Students can submit proposals:

- in writing or orally at the Faculty level - to the study programme director, the head of the department or the dean;
- in writing or orally at the LLU management level - the Studies Centre, the Vice-rector for Studies, the Rector, also the Board of Studies and the Senate, reviewing and approving the internal regulatory enactments of the Latvia University of Life Sciences and Technologies;
- anonymously, using the alert system at LLU - https://www.llu.lv/lv/trauksmes-celsana (*in Latvian*).

The LLU Study Regulations, which are available to students at Mans LLU (My LLU), set out the procedure for submitting and reviewing complaints. If a student has submitted a written complaint, then after its review, he or she will receive a written response if the review of the complaint has taken place without the student's presence.

The student can submit a complaint to the LLU Academic Arbitrage, which operates in accordance with the regulations.

More often students inform orally or in writing the director of the study programme or the dean. During the negotiations solutions, compromises are sought in case of a specific problem (change of lecturer, etc.).

**2.4. Provide information on the mechanism for collecting the statistical data, as developed by the higher education institution/ college. Specify the type of the data to be collected, the collection frequency, and the way the information is used to improve the study direction.**

LLU centrally collects statistical data from different aspects and with different regularity.

**Once a month**:

1) the number of students in study programmes - the number of students in the type and form of studies, study directions and Faculties, the compiled statistics are sent to the management of LLU and the deans of faculties; statistical data are used to follow the dynamics of the number of students at LLU;

2) fulfilment of the state-funded study places – data are compiled by study programmes in order to follow the fulfilment of state-funded study places; these data are used to forecast the number of enrolled students and to rotate the number of places in each semester (competition for state-funded study places); the compiled statistics are sent to the LLU management and the deans of the Faculties, if necessary also to the vice-deans.

**Once an academic year**:

1) number of graduates in study programmes, study directions and faculties, types of funding, these data are used for preparation of various reports (for example, LLU annual report - https://llu.lv/lv/llu-pamatdokumenti - *in Latvian*); 2) enrolment results from different aspects, those are used for planning the enrolment limits and forecasts for each following year;

3) compilation of statistical data of the LLU Augstskola-1 for the Central Statistical Bureau (CSB). The data collection is based on the forms specified by the CSB. The collected data is sent to the Ministry of Education and Science and is available to all interested parties (https://izm.gov.lv/publikacijas-un-statistika/statistika-par-izglitibu/statistika-par-augstako-izglitibu - *in Latvian*). The data is also used to prepare various reports (for example, LLU annual report).

**Once a year**:

1) summary of statistics on study direction which are made by previous study year: number of students in study programmes, number of students per the type and form of studies, graduates, dropouts, reasons, statistics of foreign students. These summaries are received by the study programme directors and these data are used for the preparation of annual reports of study directions (available at https://www.llu.lv/lv/studiju-virzienu-parskati-un-pasnovertejuma-zinojumi - *in Latvian*);

2) fulfilment of state-funded study places by year, data are used for the preparation of LLU, Ministry of Agriculture and Ministry of Education and Science contract execution reports;

3) summary of the implementation of the performance indicators of LLU Development Strategies 2015–2022 in the Educational programmes, the data are used for the annual reports on the implementation of the Development Strategy and for cascading the objectives of the performance

indicators for the next year. Strategy implementation reports on Faculties are presented in face-to-face meetings;

4) Student and teacher mobility indicators. It is compiled by the LLU International Cooperation Centre and the data are used in the preparation of various reports.

At the Faculty level, data are collected and analysed with a certain frequency in relation to the results to be achieved in studies and research planned in the LLU Strategy. The following items are also analysed:

1) evaluation of the teaching staff work quality from the students' point of view (every semester);

2) results of the graduate survey (once a year);

3) information regarding the employment of students (once a year before the end of studies);

4) qualitative and quantitative indicators of the scientific activity of the teaching staff, incl. involvement of students in research (once a year);

5) infrastructure provision (once a year).

This information is the basis for the planning of the staff development in the Faculty, for the improvement of the study process, for the planning of material and technical and study material provision.

**2.5. Description and assessment of the integration of the standards set forth in Part 1 of the ESG. Specify which of the standards are considered a challenge and which require special attention.**

LLU Development Strategy, quality management assurance, staff development, management improvement plan, infrastructure development plan are the main strategic priorities.

Integration of the standards included in Part 1 of the ESG in ensuring the internal quality of the study direction:

1. ESG 1.1. Quality Assurance Policy – LLU has developed a strategy, policy and related measures for ensuring the quality of study programmes and degrees/qualifications to be awarded. The policy documents and their implementation measures are summarized at https://www.llu.lv/lv/llu-pamatdokumenti (*in Latvian*). The quality assurance policy developed by LLU envisages the responsibility of the involved parties in quality assurance. See points 1.3 and 1.4 for more information.

2. ESG 1.2. Development and approval of programmes – LLU has developed procedures for the development and approval of study programmes, regular control and supervision, and periodic review. For more information, see point 1.4.

3. ESG 1.3. Student-centred learning, teaching and assessment – LLU implements student-centred learning.

4. ESG 1.4. Matriculation of students, course of studies, recognition and certification of qualifications – enrolment to LLU takes place on the basis of enrolment regulations approved by the LLU Senate. These regulations are approved by the Senate every year. In the LLU Information System, there is an option to follow the student's progress during studies. The student also has the

opportunity to follow the progress, the acquired learning outcomes, financial information.

5. ESG 1.5. Teaching staff – LLU has developed procedures for assessing the quality of teaching staff, including criteria for obtaining a position. Professional development is provided. For more information, see point 1.4.

6. ESG 1.6. Study resources and support for students – LLU provides appropriate study resources for the education of students, plans acquisitions/provision with the support of various projects, programmes and budget funds. Provision of resources in the study programmes, including the offer of the LLU Fundamental Library, see point 3.1 of the study programmes reports. The study programme directors regularly communicate with students about the study process, organizational issues, course content, etc. The lecturers of the study programmes have individual consultations (at least two times a week), students have the opportunity to communicate both remotely (e-mail, e-environment, telephone) and in person.

7. ESG 1.7. Information management – LLU ensures the collection of information from various aspects on the implementation of the study process, including the student's achievements (student's individual account). Details see in point 2.4.

8. ESG 1.8. Public information – LLU provides public information (qualitative and quantitative data) about study programmes, student performance, current information about research projects and cooperation projects, activities and events at LLU. Detailed information about the study offer can be found on the LLU portal in the section Studijas / Studiju programmas (*in Latvian*). Also in the study catalogue - https://www.llu.lv/buklets/llu-pamatstudiju-buklets-2020 (*in Latvian*) for undergraduate studies and https://www.llu.lv/buklets/llu-magistra-studijas-buklets-2020 (*in Latvian*) for master's studies, including thoughts and opinions of study graduates. Social networks and mass media are also used to inform the public. Lecturers are actively involved in the work of branch organizations, ministerial working groups, commissions, development of regulatory enactments, various initiatives, organization of conferences, etc. Faculty of Food Technology, Forest Faculty, Faculty of Engineering actively participate in LLU centralized events (Open Day, Career Day, participation in the exhibition School, Researchers' Night), also organize international scientific conferences.

9. ESG 1.9. Survey and regular inspection of programmes – LLU has developed procedures for reviewing, supplementing and updating the content of study courses. Students, graduates and employers, as well as industry experts, participate in the improvement of the study programmes. Recommendations for the improvement of the programmes are ranked according to their relevance and implemented in the study process.

10. ESG 1.10. Cyclical external quality assurance - external quality assessment takes place every six years, taking into account the provisions of regulatory enactments.

Increased attention is paid to the implementation of each standard, the most important is the implementation of student-centred teaching, the material base corresponding to the level of science, the qualification of lecturers, and the implementation of the research. The major challenge is student-centred learning implementation (ESG 1.3).

## II - Description of the Study Direction (3. Resources and Provision of the Study Direction)

**3.1. Provide information on the system developed by the higher education institution/ college for determining the financial resources required for the implementation of the**

**study direction and the relevant study programmes. Provide data on the available funding for the relevant study programmes, as well as the sources of the funding for the scientific research and/or artistic creation activities and their use for the development of the study direction. Provide information on the costs per one student (for each relevant study programme of the study direction) by specifying the headings indicated in the calculation of costs and the percentage of the funding among the indicated headings.**

In accordance with the LLU financial strategy, management and action policy, the use of financial resources is exercised by the LLU Financial Planning Centre. Every year, the Senate of the LLU approves the distribution of revenue and expenditure of the General Budget of the LLU, which is prepared pursuant to the Law "On the State Budget". The estimate of the General Budget (financial planning and results) is discussed in the working group "Working Group on the Use and Development of Resources", with further approval by the Senate of the LLU. The working group includes the Rector, Vice-rectors for science and studies, Chancellor, Deans of faculties, Head of the financial centre, Head of the resource accounting centre, Lawyer, etc.

The main components of the General Budget revenue and expenditure in 2020:

- for the provision of the study process EUR 10 061 701 (of which EUR 7 950 523 to cover remuneration, EUR 713 935 for scholarships, EUR 876 664 to cover total expenses, and EUR 520 579 at the disposal of the faculties);
- tuition fee income EUR 2 002 612, which is divided: EUR 1 209 855 for remuneration, EUR 403 285 to cover the total expenses, EUR 389 472 at the disposal of the faculties;
- EUR 8 021 939 for science, of which science base funding EUR 1 127 052, performance financing EUR 410 737, and other science projects EUR 6 484 150;
- ERASMUS EUR 691 945;
- donations received EUR 20 008.

The procedure for percentage distribution of the budget revenue/expenditure has been approved by the Senate of the LLU, 80% is intended for remuneration, 20% for other expenses. 60% of paid tuition fees are remuneration costs and 40% - other costs (of these 40%, 20% are at the direct disposal of the faculties, and 20% are for the provision of centralised costs). The dean of each faculty receives a monthly report on the actual expenses at the faculty. Science base funding accounts for about 13% of the total budget (50% for faculties and 50% for centralised costs).

Faculties are regularly informed about the implementation of their budget. The faculty can make operational decisions on the revision of individual expenditure items within the total funding.

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science, the Ministry of Agriculture and Latvia University of Life Sciences and Technologies. The tripartite agreement on financing for 2020 stipulates that the basic costs of one study place are EUR 1518.98, social security (for undergraduate and master's studies) is EUR 164.34. The coefficients for each thematic area of education are specified in Cabinet Regulation No. 994/2006 "Procedures for financing higher education institutions and colleges from the state budget". In this thematic area, the coefficient of study costs is 1.8 and the costs per student in undergraduate studies were EUR 2897.83 and in master's studies EUR 4264.57, in doctoral studies - EUR 10234.47 in 2020.

Table 3.1.1.

**Costs of the study place for the students of the study programmes included in the study**

**direction**
(https://likumi.lv/ta/en/en/id/149900-procedures-for-financing-institutions-of-higher-education-and-colleges-from-the-funds-of-the-state-budget)

| Programme | Study cost coefficient of the thematic educational areas | Costs per student, EUR |
|---|---|---|
| Food Quality and Innovations (bachelor's progr.) | 1.8 | 2898.03 |
| Wood Processing (bachelor's prog.) | 1.8 | 2898.03 |
| Food Technology (professional prog.) | 1.8 | 2898.02 |
| Design and Crafts (bachelor's progr.) | 1.8 | 2898.03 |
| Food Science (master's progr.) | 1.8 | 4264.86 |
| Wood Materials and Technology (master's progr.) | 1.8 | 4264.89 |
| Food Science (doctoral prog.) | 1.8 | 10235.07 |
| Wood Materials and Technology (doctoral progr.) | 1.8 | 10234.47 |

The overall distribution of the total LLU budget is formed by the estimates of structural units/faculties, where the costs are estimated by type of expenditure. The costs are divided into 4 items:

- remuneration;
- scholarships;
- goods and services;
- fixed capital formation.

See detailed information in study programme reports, paragraph 3.1. Percentage breakdown of costs is summarised in Table 3.1.2.

Table 3.1.2.

**The share of costs (%) of the study programmes implementation**

| Programme | Remuneration | Scholarships | Goods and services | Fixed capital formation |
|---|---|---|---|---|
| Food Quality and Innovations (bachelor's prog.) | 74 | 8 | 17 | 2 |
| Wood Processing (bachelor's prog.) | 73 | 7 | 16 | 4 |

| | | | | |
|---|---|---|---|---|
| Food Technology (professional prog.) | 74 | 7 | 18 | 1 |
| Design and crafts (bachelor's prog.) | 77 | 6 | 16 | 1 |
| Food Science (master's prog.) | 74 | 7 | 18 | 1 |
| Wood Materials and Technology (master's prog.) | 72 | 7 | 17 | 4 |
| Food Science (doctoral prog.) | 74 | 8 | 17 | 1 |
| Wood Materials and Technology (doctoral prog.) | 74 | 8 | 17 | 1 |

In the implementation of study programmes included in the study direction, the largest costs are for remuneration (72-77%); costs also include maintenance of utilities, premises, and equipment, maintenance of IT equipment and other equipment, maintenance of office equipment, transport services (internships, study tours), office supplies, teaching materials, literature, etc.

The total income and expenses of the faculty are summarised in the annual financial statement, discussed in the Board of Faculty.

Tuition fees at LLU are approved by the Rector’s decree. The tuition fee for the programmes included in the study direction in the study year 2019/2020 is summarised in Table 3.1.3.

Table 3.1.3.

**Tuition fees in the study programmes**

| Study programme | Full-time studies, EUR | Part-time studies, EUR | Full-time studies, EUR, implemented in English |
|---|---|---|---|
| Food Quality and Innovations (bachelor's prog.) | 1900 | --- | 3000 |
| Wood Processing (bachelor's prog.) | 1900 | 1300 | --- |
| Food Technology (professional prog.) | 1900 | 1300 | --- |
| Design and crafts (bachelor's prog.) | 1700 | 1300 | --- |
| Food Science (master's prog.) | 2200 | --- | 4000 |

| | | | |
|---|---|---|---|
| Wood materials and technology (master's prog.) | 2140 | --- | --- |
| Food Science (doctoral prog.) | 2440 | --- | --- |
| Wood materials and technology (doctoral prog.) | 2600 | --- | --- |

In addition, teaching staff and employees have access to ERASMUS+ funding for international cooperation strengthening, exchange visits, implementation of joint projects, etc.

An important source of funding is science base funding and performance funding, project funding, and research funding.

According to decision No. 17-6 of the LLU Board of Science of 28 November 2017 “On evaluation of academic staff, leading researchers, and researchers' scientific work efficiency”, the volume of science base funding for faculties is directed to the evaluation of scientific performance in points (determines the contribution of each researcher/leading researcher) and used to necessary co-financing for project implementation, science infrastructure development, support for scientific staff, publication fees, participation in conferences and symposiums.

The allocated funding allows one to implement the study process of appropriate quality, to develop cooperation with research institutes in Latvia and abroad, to improve the resource and research base, to increase the qualification of the staff, in general, to maintain the appropriate level of qualification for the implemented direction of study.

**3.2. Provide information on the infrastructure and the material and technical provision required for the implementation of the study direction and the relevant study programmes. Specify whether the required provision is available to the higher education institution/ college, availability to the students, and the teaching staff (the specific equipment required for the relevant study programme shall be indicated in Part III, Chapter 3 below the respective study programme).**

The implementation of the study programmes of the study field “Production and Processing” is carried out in various faculties of the LLU.

**The Faculty of Food Technology** is located in Jelgava, 22a Rīgas Street. The resources and technical base of the faculty are designed to provide a modern study and research environment for food studies. The Study and Science Centre of the Faculty of Food Technology was commissioned in August 2015. A new building with a modern study and research environment was built thanks to ERDF project No. 2010/0119/3DP/3.1.2.1.1./09/IPIA/VIAA/009 “Modernisation of LLU study infrastructure” (2010-2015) and No. 2011/0040/2DP/3.1.2.1.1./11/IPIA/VIAA/022 “National Importance Research Centre for the Utilisation of Agricultural Resources and Food” (2012-2015). The faculty has the following laboratories and pilot plants: Laboratory of Food Processes, Food Packaging Laboratory, Sensory Evaluation Laboratory, Microbiology Laboratory, Biotechnology Laboratory, pilot plants: dairy, meat, fruit-and-vegetable, grain processing, brewery. Laboratories

and pilot plants are provided with modern equipment, small-scale technological equipment for food development and quality testing. Students can use analytical equipment (chromatographs, mass spectrometers, viscometers, analysers of structural properties of food, also fat, protein, fibre, including dietary fibre, flour analysers, milk analyser) and technological equipment (dryers of various constructions: spraying, convection, microwave, sublimation; high-pressure equipment; spray dryer with particle microencapsulation option; autoclaves, including back-pressure autoclave; flow pack packaging equipment), technological equipment for meat production (thermal chambers, cutter, etc.), technological equipment for milk processing (for the production of cheese, butter, condensed milk), membrane equipment module: for ultrafiltration, microfiltration, reverse osmosis, nanofiltration; technological equipment for grain processing (mills, ovens, extruders), biofermentor complex for the simulation of gastrointestinal tract function (implementation of *in vitro* process); system for input and analysis of sensory evaluation results.

**The Forest Faculty** is located in Jelgava, 11 Akadēmijas Street, where the main study building with auditoriums is located, etc. The Department of Wood Processing is located in a separate building in Jelgava, 41 Dobeles Street; it provides training for wood processing specialists. Students have various laboratories at their disposal created and maintained in cooperation with Forest and wood products research and development institute. The laboratories are available in the following areas of activity: Laboratory for the research and testing of physical and mechanical properties of wood, Laboratory for the testing and research of biofuels, Laboratory for the testing and research of fire reaction, Laboratory for the testing and research of furniture. During the reporting period, new equipment for determining volatile matter emissions from wood products, ash melting temperature determination equipment, equipment for determining the mechanical properties of materials of small wood samples, infrared thermography camera for the analysis of thermal parameters, high-speed video camera for recording and analysis of dynamic processes, equipment for wood moisture determination, and ancillary equipment for the production and transfer of samples. For a more detailed list of equipment available, see Table 3.1.1 of Section 3.1 of the Self-assessment report of the academic master's study programme Wood Materials and Technology.

**The Faculty of Engineering** is located in Jelgava, 5 Čakstes Bulvāris, where the Institute of Education and Home Economics is located with a resource and technical base for the implementation of design and craft studies. Within ERDF project No. 8.1.1.0/17/1/001 “Modernisation of LLU STEM study programmes”, the resource base has been supplemented with new sewing machines, embroidery machines, overlocks, mannequins, steam ironing systems, as well as a set of equipment for testing the physical and mechanical properties of textiles, purchased knitting machines for the textile technology workshop, a 3D printer, and a set of Unimat wood drilling, milling, and turning equipment (see the annex *DA_materiālais_nodrošinājums* of the study programme Self-evaluation report). The resource base of the Institute of Motor Vehicles (metal technology) and the Department of Wood Processing (wood technology) of the Forest Faculty is used for the training of students specialising in wood/metal technology and design.

The training of the students of the undergraduate study programmes included in the study field is carried out in the following university faculties: Information Technology, Environmental and Civil Engineering, Forest, Economics and Social Development, Engineering and Food Technology.

Significant resources have been invested in the last 7 years to improve the study environment at the university, including the modernisation and adaptation of the study environment for students with mobility impairments. Wi-Fi is available in all buildings, and students and teaching staff can log in with a username and password. Students can use open-access computers, which have access to the internet, databases and the LLU Information System (LLU IS). Auditoriums are provided with multimedia projectors or screens connected to computers. For the needs of the study process, computer classes are available, equipped with various software (SPSS, AutoCAD, etc.).

Students and lecturers are provided with a developed IT infrastructure (maintained and renewed) and a virtual environment: LLU and faculty websites (current information, lesson schedules, announcements, etc. are published); Mans LLU ("My LLU") - an internal network of LLU, where information and documents for internal use for students, lecturers, and employees are published); e-learning environment (developed on the basis of Moodle, with study materials, communication with students/lecturers is provided, a video conferencing system BigBluButton is available, which is used for lectures, seminars, meetings). There is an LLU IS with a register of study courses (free access) and a system in which students and teaching staff (authorised access) are provided with information and services (study courses, registration for studies, elective courses, questionnaires). There are LLU IS data entry, processing for employees, study programme directors, heads of structural units (authorised access). The directors of the study programme have access to students' grades, decrees, and other information. LLU has implemented a document management system.

The description of the existing infrastructure and planned investments of the LLU is summarised in the Characteristics of the planned investments of the Latvia University of Life Sciences and Technologies (https://www.llu.lv/sites/default/files/2020-05/LLU_Planoto_investiciju_akstsurojums.pdf - *in Latvian*) in accordance with the LLU development strategy 2015-2022.

For the implementation of the master's and doctoral studies, a range of laboratory services is available at the LLU, such as the Department of Agronomic Analysis of the Scientific Laboratory of Biotechnology, the Department of Molecular Biology and Microbiology, and the Department of Smart Technologies.

The study process employs equipment purchased within the framework of the project, including the constructed buildings. Within the framework of ERDF project No. 2012/0001/2DP/2.1.1.3.1/11/IPIA/VIAA/005 "National Importance Research Centre of Forest and Water Resources for the Development of Scientific Infrastructure" (2012-2015), investments in the amount of EUR 1 229 3030 have been made; within the framework of ERDF project No. 2011/0040/2DP/3.1.2.1.1./11/IPIA/VIAA/022 "National Importance Research Centre for the Utilisation of Agricultural Resources and Food" (2012-2015), investments in the amount of EUR 3 995 513 have been made. The development of the LLU infrastructure has been facilitated by subsidies from the Ministry of Agriculture in the amount of more than EUR 2 000 000 (2015-2016). Within ERDF project No. 8.1.1.0/17/I/001 "Modernisation of LLU STEM study programmes" framework, premises, laboratories, computer classes necessary for the implementation of LLU STEM study programmes have been equipped and modernised in the amount of EUR 450 000.

Students and lecturers have access to:

1) Technology and knowledge transfer department services;

2) Hotel services;

3) LLU Sports Centre services;

4) LLU Fundamental Library services (see paragraph 3.3).

**3.3. Provide information on the system and procedures for the improvement and purchase of the methodological and informative provision. Description and assessment of the availability of the library and the databases to the students (including in digital environment) and their compliance with the needs of the study direction by specifying whether the opening times of the library are appropriate for the students, as well as the**

**number/ area of the premises, their suitability for individual studies and research work, the services provided by the library, the available literature for the implementation of the study direction, the databases available for the students in the respective field, the statistical data on their use, the procedures for the replenishment of the library stock, as well as the procedures and options for the subscription to the databases.**

When starting studies, each student is assigned a username and password, which can be used in the LLU Information systems: e-studies environment, Mans LLU, LLU e-mail, students' personal account, incl. library services.

The programme of the study direction has a variety of methodological and informative support, it is available in the LLU Fundamental Library (FB) and at the place of implementation of the study programme - at the Faculty of Food Technology of the LLU.

FB **working hours** are tailored to the needs of students and teaching staff. On weekdays, the library is open from 8.30 to 19.00, Fridays from 8.30 to 17.00. The library is also open to readers on the first Sunday of each month from 9.00 to 14.00. The working hours of the FB Reading Room and Reference and Information Centre are extended until midnight during individual studies and examination session. The catalogue and online databases are available without time limit 24/7.

Table 3.3.1

**Information about the reader service premises in the LLU Fundamental Library**

| Room No. | Name | Area, $m^2$ |
|---|---|---|
| 161 | Subscriptions | 26.9 |
| 254 | Reading room with reading room balcony | 619 |
| 255-1 | Quiet reading room | 34.3 |
| 255 | Reference and information centre | 57.6 |
| 76 | Study literature loan | 49.3 |
| Total | | 787.1 |

The reading room has comfortable workspaces both in the hall and on the balcony. Internet and WI-FI are available. The reading room has also a seating area with comfortable sofas. There is a quiet reading room. The reference and information centre has desktop computers and the services of a qualified consultant.

The following free services are available at LLU FB:

- computers with internet connection and wireless internet;
- opportunities to use the following software Autodesk EDU Masyer suite 2018 (AutoCAD, AutoCAD Structural Detailing, Autodesk Robot Structural Analysis professional, etc.), CorelDRAW X7, SPSS Statistics v21, VISION 2013;
- 24/7 use of online databases created by the library, subscribed and free of charge online

databases;
- issuing/receiving books, serials and other documents;
- training for working with full-text and bibliographic databases, consultations for working with computers and the Internet;
- classes for LLU teaching staff, incl. online about searching for information, creating personal accounts, adding publications from the LLU lecturers and researchers' publications database to the LLU IS personal account, use of Mendeley, creating researcher identification numbers ORCID and Research ID, etc.;
- classes for doctoral students, master students, undergraduate students in English;
- support materials for each target audience (researchers, students, other users) and sending them on request; completion of inquiries and consultations about the library and its use;
- editing bibliographies, sending examples of bibliography descriptions to e-mail upon request;
- creation of exhibitions to order.

The following paid services are available at LLU FB:

- copying (colour, black and white);
- prints (colour, black and white);
- scanning;
- execution of written thematic inquiries;
- Interlibrary and International Interlibrary Loan services (postal services must be covered);
- delivery of copies of documents (according to the suppliers' pricing);
- spiral binding.

The library offers the following e-services:

- the use of electronic catalogue 24/7;
- electronic reservation of books, extension of the return deadline 24/7;
- the use of united search engine PRIMO DISCOVERY;
- 24/7 use of library-created, subscribed and free online databases (both full-text and bibliographic), possibility to use the "Ask the Librarian" service in the EBSCO database;
- possibilities to connect to subscriber e-journal and e-book databases outside the LLU network using the EZproxy and LLU IS user account 24/7;
- use of the Mendeley scientific information retrieval program;
- opportunities to use other online information resources from the library website;
- opportunities to use information resource support materials prepared from the library home page both by LLU FB and offered by database maintainers;
- electronic delivery of documents;
- "Articles for the librarian", Skype;
- "Book Request Form" on the library's website.

Available databases for the relevant field

LLU FB offers users various online databases and databases on other media. The library has purchased the search engine PRIMO DISCOVERY, which provides opportunities to search simultaneously in subscribed and open access online databases, in the electronic Joint Catalogue of Libraries of National Significance, in databases created by LLU FB (publications of LLU lecturers and researchers, LLU master's thesis, etc.). By registering with the LLU IS user account, one can view his/her user account and extend the deadlines for loaned publications, order publications, access full texts in subscribed online databases, save search results. The "Help in Information Finder PRIMO" is available on the library's website. Access to online databases is provided 24/7 in the LLU network, as well as to authorized users outside the LLU network, using the EZproxy and LLU IS user accounts.

Before offering databases to users, they are analysed for search capabilities, thematic coverage, chronological coverage, and access options. Information about databases is prepared, their descriptions are posted on the LLU FB website.

LLU FB users have the opportunity to search for information in the following subscribed foreign and Latvian online databases:

- CAB Abstracts;
- CRC Press e-books;
- EBSCO eBook Academic Search Complete,
- MasterFILE Premier and others;
- ScienceDirect Journals;
- Scopus;
- SciVal;
- Web of Science;
- Wiley Online Journals;
- Lursoft.

Table 3.3.2

**Use of foreign databases subscribed to by LLU FB in direction "Production and Processing" in 2020**

| Database | Number of connection sessions | Number of searches |
|---|---|---|
| *CAB Abstracts* | 2590 | 7820 |
| *EBSCO* | 44174 | 130695 |
| *EBSCO e-book* | 6568 | 19364 |
| *ScienceDirect Journal* | 38118 | 50905 |
| *Scopus* | 18343 | 23859 |
| *Web of Science* | 5122 | 24503 |
| *Wiley Online Journals* | 7592 | 10439 |
| *Taylor&Francis Group CRC Press e-book* | 4943 | 6694 |

LLU FB offers also various online databases for a trial period.

Readers are also offered databases created by LLU FB employees:

- *Publications of LLU lecturers and researchers;*
- *Doctoral theses defended at LLU;*
- *LLU conference materials;*
- *Patent publications of LLU lecturers and researchers;*
- *Publications about LLU.*

LLU FB is the deposit library of the Food and Agriculture Organization of the United Nations and the AGRIS national centre, which participates in the development of the international AGRIS database.

The library collection is mainly compiled according to the recommendation of the lecturers. A "Book Request Form" is available on the library's website. LLU FB purchases editions taking into account the demand of lecturers, other library users, as well as the demand created by the Faculty. The LLU FB has developed a "Collection Acquisition Policy", which stipulates that the main priority in the acquisition of the collection is the LLU study programmes and research directions. In accordance with the Law on Mandatory Copies, the LLU FB, as a library of national significance, receives one copy of each printed work and electronic publication in the fields of the LLU specialisation.

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

The process of attracting and employing the teaching staff of the LLU (incl. announcing vacancies, hiring, election procedure, etc.) is regulated by the Regulations on Academic Positions of the Latvia University of Life Sciences and Technologies approved by the LLU Senate. Regulations are available at https://www.llu.lv/sites/default/files/2021-04/Nolikums%2014.04.2021.pdf (*in Latvian*).

**Selection**

The number of positions of professors, associate professors and assistant professors in the respective sub-sectors of the science field is determined by the LLU Senate according to the funding possibilities and necessity for the implementation of study programmes by the decision of the Board of Faculty. Occupation of an academic position at LLU takes place in accordance with the open competition procedure specified in the *Regulations on Academic Positions of the Latvia University of Life Sciences and Technologies*.

**Requirements**

Applicants for an academic position need a scientific or academic degree specified for the specific position. Requirements for applicants for academic positions are determined by the Law on Higher Education Institutions. The common requirements for all applicants for academic positions are:

- knowledge of the state language in accordance with the requirements of regulatory enactments;
- knowledge of foreign languages at the level required for the performance of the duties of the academic position, incl. conducting classes in these languages;
- continuous improvement of one's academic and scientific qualification.

**Electing**

Based on the received proposals of the academic structural units regarding the vacant academic positions, the LLU Personnel Department prepares a draft announcement and submits it to the LLU Academic Personnel and Structural Policy Commission for consideration. After the decision of the commission, the Personnel Department prepares a draft on the vacant academic positions and submits it to the LLU Senate for approval. After the decision of the Senate is made, the Personnel Department announces an open competition for the vacant academic positions by publishing an advertisement in the newspaper *Latvijas Vēstnesis* and on the LLU portal.

Elections shall be held by secret ballot: for the position of professor and associate professor in a specific field – in the respective Councils of Professors not later than within four months from the date of announcing the competition; in the position of assistant professor, leading researcher,

researcher, lecturer, assistant and research assistant – in the Boards of Faculties not later than within three months from the day of announcing the competition.

The Rector concludes a contract with the person elected to the academic position for the term of election. If the LLU has a vacant academic position, the LLU Senate may not announce a competition upon the proposal of the Board of Faculty. In this case, the Rector may hire a visiting professor, visiting associate professor, visiting assistant professor, visiting lecturer, visiting assistant for a period of up to two years.

**The individual academic work** of the academic staff is planned in each academic year in accordance with the *Regulations on LLU academic work calculation* and the Rector's order *On planning, accounting and control of the individual workload of the teaching staff in the academic year*, which determines the academic staff work components, regulations, accounting and control procedures.

Remuneration for the academic position is determined on the basis of the Cabinet of Ministers Regulations No. 445/2016 "Regulations Regarding Remuneration Teachers" (see https://likumi.lv/ta/en/en/id/283667-regulations-regarding-remuneration-of-teachers) and the Rector's Order *On Teachers' Remuneration*.

The professional development of the academic staff includes both the acquisition of appropriate professional development programmes and the exchange of experience and participation in conferences and seminars, which is confirmed by the documents issued at the end of them.

Every six years, academic staff are entitled to paid leave of six calendar months for research and scientific work outside the university.

The procedure for professional development is determined by Cabinet Regulation No. 569/2018 "Regulations on the Education and Professional Qualifications Required for Teachers and the Procedure for Improving the Professional Competence of Teachers" (https://likumi.lv/ta/id/301572-noteikumi-par-pedagogiem-nepieciesamo-izglitibu-un-profesionalo-kvalifikaciju-un-pedagogu-profesionalas-kompetences-pilnveides-kartibu - *in Latvian*). These regulations stipulate that the pedagogical qualification required for university teaching staff must be obtained in further education professional development programmes on innovations in the higher education system, university didactics or educational work management in the amount of 160 academic hours (including at least 60 contact hours) until the end of the election period in the academic position. The LLU has established a professional development programme for higher education teachers "Innovations in Didactics of the Higher Education Institutions". The aim of the programme is to improve the knowledge of higher education teachers in the didactics of higher education and the possibilities of their use in pedagogical work. After mastering this program, a certificate is issued.

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

The requirements for academic positions are determined by the Law on Higher Education Institutions, the qualification of the teaching staff is determined by the *Regulation of the Latvia University of Life Sciences and Technologies on academic positions* approved by the Senate of LLU. Invited teaching staff (not elected to an academic position) must meet exactly the same requirements and qualifications as elected academic staff of the appropriate level.

LLU describes the processes for ensuring the qualification and quality of work of lecturers. One of them is the election and re-election process of the academic staff (*Regulation of the Latvia University of Life Sciences and Technologies on academic positions*).

The growth, qualification improvement and evaluation of the academic staff are important personnel management processes that promote the professional development of the existing employees. Since 2017, LLU has established a teaching staff motivation system (internal document, the Board of Studies of LLU Decision No. 2.4-13 / 8). The established system allows to receive a bonus for a well-valued work. The motivation system includes the evaluation of the teaching staff according to 14 criteria, which are defined into 5 groups: student evaluation; preparation of teaching aids and study process (including student final theses with *excellent* and *outstanding* evaluation); organizational work; professional development and scientific work. Each indicator has a certain weight and the points obtained are summed (a point corresponds to a specific amount in euros). This system allows to evaluate the activity of the teaching staff, the quality of work and to be remunerated according to uniform criteria.

The skills and work performance of the academic staff are evaluated according to the students' evaluation, which the students perform anonymously in their LLU Information System account after the completion of the study course at the end of the semester. Students evaluate the work of the lecturer on a 5-point scale (very high (5 points) to very low (1 point)), evaluating the quality of course implementation, availability of study materials, quality, faculty's ability to interest students, etc., students also have the opportunity to express their assessment in writing. The obtained evaluation is available to each lecturer individually, the director of the study programme, the head/director of the department/institute. According to the obtained results and provided comments/suggestions, the lecturer improves the study course. The director of the study programme and the head of the structural unit take into account students' evaluations when organizing work for the next study year.

For the exchange of experience and control of lecturers' classes, LLU has established and operates a procedure for observing classes.

The quality of the study process is ensured at several levels. At the individual level, the lecturer is obliged to ensure a quality study process by constantly improving their competence (conducting research and publishing research results, participating in international conferences, regularly reviewing study results, improving the content of the study course, sharing academic experience).

LLU offers several opportunities for teaching staff to improve their qualification: 1) participation in the ERASMUS + mobility programme for conducting lectures and exchanging experience;

2) participation in the annual LLU Academic Conference, one of the goals of which is to share the experience with colleagues;

3) to increase pedagogical competence in the centrally organized professional development programme for higher education institution pedagogues of LLU “Innovations in the didactics of higher education institutions” (mandatory for elected academic staff once every six years).

The Language Centre of LLU offers an English language improvement course for university lecturers.

Since 1998, LLU has been organizing an annual competition for textbooks and study materials with the aim of promoting the preparation and publication of new textbooks and study materials (also in electronic form).

Several ESF projects are implemented by LLU:

1) 8.2.2.0/18/A/014 “Improvement of LLU academic staff”, with the aim – growth of the academic staff to improve the quality of the study process by improving competence, cooperation with industry, attracting doctoral students and foreign guest lecturers;

2) 8.2.3.0/18/A/009 “Improvement of the management of Latvia University of Life Sciences and Technologies”, within the framework of which the teaching staff of the study direction improves English language skills, professional skills in the field of IT, and carry out internships in branch companies.

The teaching staff appreciates the involvement in various pedagogical and professional development activities offered and organized by the university. The acquired skills are used in the improvement of study course materials, updating of study course programmes. The teaching staff involved in the study direction participates in the decision-making institution of the faculties (Board) and methodological commissions, thus the gained experience can be applied in the organization of the joint work process. Further training provides an opportunity for the teaching staff to develop an academic and administrative career at LLU.

**3.6. Provide information on the number of the teaching staff members involved in the implementation of the relevant study programmes of the study direction, as well as the analysis and assessment of the academic and research workload. Provide the assessment of the incoming and outgoing mobility of the teaching staff over the reporting period, the mobility dynamics, and the issues which the higher education institution/ college must tackle with regard to the mobility of the teaching staff.**

Both elected and non-elected academic staff participate in the implementation of study directiond programmes. In the 2019/2020 academic year, 120 lecturers participated in the implementation of the study direction, of which 20% professors, 13% associate professors, 31% assistant professors (including visiting assistant professors), 35% lecturers (including visiting lecturers), 1% visiting assistants and researchers. More than 63% of the implementers of study programmes have a doctoral degree.

The workload of the teaching staff for the study year is planned in accordance with the internal regulatory documents. The Regulations on Calculating of Academic Work and the LLU Rector's decree on the planning, accounting, and control of the individual workload of the teaching staff in the study year determine the regulations, accounting and control procedures for planning the pedagogical workload. The pedagogical workload of lecturers is planned in accordance with the study plan and the course implementation plan for the semester.

Teaching staff Curriculum Vitae (in Europass format), the summary about the teaching staff involved in study direction, their qualifications, the election status at the university, the teaching of study courses are summarised in Annex 3. *List of teaching staff in the direction of study Production*

*and Processing* and in the Annex *Teaching staff CV.*

The lecturers of the study direction are active in science. The results (performance) of the scientific activity of the academic staff are summarised once a year, which is the basis for determining the principles of the lecturer's remuneration. The scientific activities of the academic staff are summarised in the CV.

Lecturers also participate in ERASMUS+ mobility. LLU has concluded cooperation agreements with other EU higher education institutions that implement study programmes equivalent in terms of study content. The teaching staff goes abroad to give lectures/classes on the chosen/agreed topic, and also to exchange experience.

In total, 44 lecturers (39% of the lecturers employed in this direction) gave lectures/classes and went for experience exchange visits abroad (a total of 139 mobilities were implemented from the 2013/2014 to the 2019/2020 academic year, of which 73 (53%) were intended for giving lectures/classes). The analysis of the countries to which lecturers went to give classes/lectures shows that these are Estonia, Poland, Turkey, Italy, France, Germany, Austria, Czech Republic, Slovakia, Portugal, Spain, Lithuania, Croatia, Greece, Bulgaria, Cyprus, Malta, Hungary, Great Britain, Iceland, Slovenia, Finland, Sweden, Denmark, Belgium.

Foreign lecturers come to give lectures on foodstuffs and wood materials. A total of 43 foreign lecturers have participated in conducting lectures; they have represented Lithuanian, Finnish, Icelandic, Norwegian, Danish, Turkish, Kazakhstani, Polish, Greek, Romanian, Estonian, Portuguese, Slovak, and Swedish universities.

The mobility of the teaching staff of the study direction is mainly implemented within the framework of the ERASMUS+ programme, but the lecturers also have individual cooperation agreements, which envisage the mobility of the lecturers. The main difficulty for teachers in implementing mobility activities is conciliation workload and responsibilities, including work on research projects, with mobility activities.

Information on the mobility of incoming and outgoing lecturers is summarised in Annex 4. *Mobility of Foreign Lecturers and LLU Lecturers*.

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

LLU provides various types of support to students in the study process:

- Informative – information on the study process, timetable, study programmes content, scholarships, enrolment procedures and necessary documents is published on the websites of LLU and Faculties. Internal normative and methodological documents have been published in the LLU intranet Mans LLU, also tips for work in the e-studies environment have been published, etc.;
- Methodological – consultations on the acquisition of study courses in person and online (using e-studies environment, e-mail, BigBlueButton, etc.); information, requirements and materials for the successful acquisition of the study course have been published in the e-studies; the database catalogues are available at the LLU Fundamental Library, in the library catalogue it

is possible to search the necessary literature source, book them and follow the return deadline (including extending it if necessary); methodological instructions for the development and design of various study papers have been published on the websites of the faculties;
- Technical – troubleshooting of e-studies environment and in the use of the Internet;
- Financial – scholarships, allowance in tuition fee in accordance with regulatory enactments and the procedure specified by the LLU;
- Careers - Career days, Career Week events organized by the Faculties, LLU Lifelong Learning Centre career events (https://www.mc.llu.lv/karjera - *in Latvian*);
- Psychological - LLU Student Union mentoring program "Student - student friend", the support provided by the directors of the study programmes, the support provided by the International Cooperation Centre of LLU for foreign students.

**Financial support**

During studies, students have the opportunity to receive scholarships (https://www.llu.lv/stipendijas - *in Latvian*). According to the competition, students can apply for:

1) a state scholarship - for monthly undergraduate and master's students the monthly scholarship is 99.60 EUR (increased to 200 EUR during the pandemic), in doctoral studies 113.83 EUR per month;

2) one-time scholarship - during the semester a student can apply for a one-time scholarship in the amount of 2 minimum scholarships;

3) a scholarship for obtaining a scientific degree - a scholarship equivalent to a loan in the amount of EUR 85.37 (the award of scholarships has been terminated as of 1 March 2020);

4) LLU Development Fund (LLU AF) scholarship - the fund offers students 18 scholarship programmes (from 40 to 1500 EUR). Scholarships are monthly and one-time.

**Tuition fee discounts**

LLU offers tuition fee reductions (from 50 to 100%) for successful students in the following cases:

1. Employees of LLU who study in doctoral study programmes;
2. Children of LLU employees;
3. Persons with group I and II disability;
4. Orphans or persons left without parental support;
5. Student athletes.

Students of the study direction "Production and Processing" study programmes can participate in the following scholarship competitions:

- in basic studies - 11 scholarship programmes (K.Ulmanis, J.Čakste, Senate, Mirdza Oškalne, Artūrs and Ērika Gerhards (only Faculty of Food Technology students), Jānis and Millija Kāvuši, Jānis Rūvalds, JSC Rīgas Dzirnavnieks (only Faculty of Food Technology students), Arvīds Kalniņš (only Forest Faculty students), AS Latvijas Balzāms (only Faculty of Food Technology students), Pētera Delle (only Faculty of Food Technology students) scholarships);
- in master studies - 5 scholarship programmes (K. Ulmanis, J. Čakste, Senate, Mirdza Oškalne, Jānis and Millija Kāvuši scholarships)
- in doctoral studies - 1 scholarship programme (Jānis and Millija Kāvuši scholarship).

LLU provides support to foreign students in the following issues:

1) application for studies is implemented using the e-admission system "Dream Apply", which provides the admission procedure and significantly facilitates the applicant's communication with

LLU, International cooperation centre coordinators individually answer specific questions of interest to the applicant;

2) all foreign students are provided with places in well-equipped student service hotels;

3) in order to acquaint foreign full-time and exchange students with the study environment and everyday life of LLU, including the cultural environment of Latvia, a "Welcome Week" is organized in the first week of each semester, during which corporate consolidation events take place;

4) LLU International cooperation centre provides technical support in matters of obtaining/extending visas, residence permits, as well as insurance;

5) LLU International cooperation centre and faculties external relations coordinators, as well as study programme directors, inform foreign students about LLU internal regulations and their application practice, provide consultations on the study and household issues, help to draw up documents, solve problems, etc.;

6) LLU "ERASMUS Student Network" group and LLU Student Self-Government, which organizes students' leisure and cultural events;

7) LLU International cooperation coordinators inform foreign students about available health care at family doctors and Jelgava Clinic, if necessary, perform the functions of a companion;

8) starting from the study year 2019/2020, a survey of foreign students is introduced every semester by the acquired courses, which demonstrates their satisfaction with the quality of the implemented study courses.

## II - Description of the Study Direction (4. Scientific Research and Artistic Creation)

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

In the study direction, research is implemented in the following directions:

1) wood materials science;

2) wood treatment and processing technologies;

3) marketing and logistics of wood and wood products;

4) food safety and risks;

5) reduction and rational use of production by-products and residues;

6) research of biologically active substances in food raw materials and products.

The chosen directions of wood research are related to research activities, the main research topics, which are implemented at the Department of Wood Processing, Forest Faculty. The increase in wood use over the last decade and over the next decade will be significant in the context of the

implementation of the green course strategy in Europe and the world. Wood, as an ecological and $CO_2$-neutral material, will play an increasingly important role in the construction industry. Approximately, it can be predicted that the use of wood in construction in Latvia lags behind the Nordic countries by about 10 years. In the Nordic countries, there is a very rapid increase in the demand for wood materials, in the provision of which the Latvian wood industry is also actively involved. In the age of technological development, there are constantly challenges to develop, improve, create innovative products and technologies, in which graduates, master's and doctoral students should be actively involved. The growth of new specialists in the field of wood materials and technology is a national strategic task, as the share of exports in the wood processing sector is 20% of the country's total exports and the research development of this sector must not be neglected.

The chosen directions of food research are related to research activities, the main research topics that are implemented at the Faculty of Food Technology.

These research directions have established themselves as the world pays more and more attention to processing technologies with minimal effect on food composition in an effort to maintain the stability of biologically active substances. Biologically active substances in food raw materials and products improve the functions of the human body, preventing the formation of undesirable compounds. By looking for ways to preserve biologically active compounds, to identify their composition and content, new products with positive health effects can be developed.

The food market, which is subject to globalization and competition, also poses a challenge to operate in a highly competitive environment and to work on the development of new processes, technologies and products in search of solutions for the use of scientifically based, nutritionally dense products.

Food safety is a key factor in ensuring public health, and comprehensive research into food safety, the emergence of potential compounds in its production, and the factors that contribute to it are areas of scientific research and new results. Integrated food production, including the processing of by-products and residues into value-added products, is one of the key challenges of the European Green Deal, and promoting research to accumulate new knowledge and results is helping economic sectors to find solutions for environmental sustainability.

The research implemented in the study direction is closely related to the priority research directions of LLU, which are defined in the LLU strategy (https://www.llu.lv/sites/default/files/2020-12/StrategijaENG_8_12_2020.pdf), they are implemented by the Faculty of Food Technology and the Forest Faculty lecturers, leading researchers, researchers and doctoral students. The faculties are also responsible for the implementation of the programmes included in the study direction with the participation of the Faculty of Engineering. In addition, this study direction is one of the priority directions of studies at LLU, the main direction of STEM. The research carried out within the direction in the fields of food and wood materials and technology are the main areas of the Latvian Smart Specialization Strategy included in the bioeconomy sector.

In this direction, the doctoral study programmes "Food Science" and "Wood Materials and Technology", the only doctoral level programme in this field in Latvia, are being implemented. The topics of the developed doctoral theses are corresponding to the topics and sub-themes defined in the priority research field *Engineering* of LLU Strategy. For a more detailed description of the topics of the doctoral theses and their connection with the strategic research directions of LLU, see section 2.5. of the study programmes self-evaluation reports.

Lecturers and students of the professional bachelor's study programme "Design and Crafts"

develop the direction of artistic creativity in the study direction, their performance can be seen in thematic exhibitions at the Faculty of Engineering, etc. For more details see section 4.5 of the study programme self-assessment report.

### 4.2. The relation between scientific research and/or artistic creation and the study process, including the description and assessment of the use of the outcomes in the study process.

Undergraduate, master's and doctoral students also participate in the implementation of research projects, developing bachelor's, master's thesis and doctoral thesis. The competencies acquired in project development are the basis for the offered topics of bachelor's, master's thesis and doctoral thesis. For example, the outcomes of the EUROLEGUME project (European 7th Framework Programme project) provided an opportunity to develop the doctoral thesis in food and beverage technology science. The competencies acquired in the projects of the state research programmes (AgroBioRes, RESPROD) gave an opportunity to develop master's thesis and doctoral thesis, etc. The support of the Forest and Wood Products Research Institute allowed the development of doctoral thesis, master's thesis, and diploma projects in the field of wood materials and technology.

The conclusions of the implemented projects have given lecturers opportunities to improve the curricula of study courses.

The implementers of the study direction also organise scientific conferences, allowing one to widely discuss the research results.

Every four years, the Faculty of Food Technology, in cooperation with Riga Stradiņš University and the University of Latvia, organises an international scientific conference “Nutrition and health”, and students and lecturers participate in its sections with reports, etc. Participation in conferences gives students the opportunity to strengthen their theoretical knowledge with state-of-the-art findings, providing a broader vision. In co-operation with Kaunas University of Technology and Tallinn University of Technology, a Baltic Food Science and Technology Conference is organised every year in one of the Baltic states. Lecturers and students of the study direction participate in the conference with reports or poster presentations, the students also participate as listeners, getting to know the faculty's research activities. Conference Proceedings (indexed Web of Science) are also published and used in the study process and in the development of final works. The research results are presented within the framework of the annual international food exhibition “Riga FOOD”, both during thematic seminars and on the exhibition stand.

The Faculty of Engineering annually organises the international scientific conference “Rural Environment, Education, Personality”, in which the lecturers of the professional bachelor’s study programme “Design and Crafts” participate with reports. Conference Proceedings (https://llufb.llu.lv/conference/REEP/2021/Latvia_REEP_2021_proceedings_No14_online.pdf) are published and are indexed in the Web of Science database. The students get acquainted with the artistic work of the lecturers of the study programme “Design and Crafts” in the study courses, which are at the same time the material of study demonstrations, etc. The faculty has an exhibition hall, where students in this programme exhibit their work, which is both an aesthetic pleasure for every visitor of the faculty and an educational and idea-promoting event.

The Forest Faculty organises various scientific events, in which the faculty’s academic staff, master's, and doctoral students participate with reports, presenting the results of the research.

Thus, the Forest Faculty in cooperation with Latvian State Forest Research Institute “Silava” and the Latvian Academy of Agricultural and Forestry Sciences organises an international scientific conference “Science and Practice for Forest Industry Development”, which aims to educate the public about Latvian forest management and the wide range of uses of the timber, attractively showing wood in the diversity of its use, manufacturing products with high added value. A “Forest Days” event is also organised, in which science and practice are closely intertwined.

Research results are also demonstrated at the annual event “European Researchers' Night”, which aims to provide an opportunity to get acquainted with the state-of-art in the field and with the work of scientists. Students of all levels participate in the implementation of this event.

All responsible faculties also organise student scientific conferences (http://ptf.llu.lv/lv/studentu-konferences; http://www.tf.llu.lv/lv/studentu-zinatniskas-konferences - *in Latvian*), where students present reports regarding the research work done and developed during the study course(s). Every year, LLU organises an international student scientific conference “Students on their way to science” (https://www.sws.llu.lv/), where students have the opportunity to acquire public speaking skills, the ability to discuss, argue, and answer questions.

It should be noted that the works of master's and doctoral students in this field of study receive an award established by the joint-stock company's Development Finance Institution ALTUM, proving a high scientific level and topicality of the developed works.

Scientific research and artistic creativity are closely related to the study process in the study direction “Production and Processing”.

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

The main international research activities of the academic staff included in the study direction are the realisation of the below-mentioned projects:

1) participation in FP7 projects (,,ERASysAPP" projekts „Systems biology platform for the creation of lean-proteome Escherichia coli strains” (LEANPROT); Nr. FP7 KBBE-2013-7-613781 "Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed (EUROLEGUME)";

2) participation in Horizon2020 projects;

3) participation in COST activities (CA18101 Sourdough biotechnology network towards novel, healthier and sustainable food and bioprocesses);

4) European Researchers’ Night in Latvia (2018-2019);

5) Nordplus (Diversification of the Nordic protein sources)

6) participation in ERASMUS + (KA2) programme projects, etc.

Academic staff participates in various international organizations as members or experts:

1) Nordic Association of Agricultural Scientists,

2) L’Oréal For Women in Science Baltics,

3) Whole Grain Initiative, etc.,

4) InnovaWood;

5) European Group of Organisations for Fire Testing, Inspection and Certification;

6) Wire Safe Use of Wod;

7) European Network of Learning and Teaching in Agriculture and Rural Development;

8) DLG (Deutsche Lanwirtschaftliche Gesselschaft).

The academic staff involved in the study direction are:

1) members in the editorial boards of international scientific journals (Rural Sustainable Research, Research for Rural Development, Baltic Forestry, Problems of Quality, Millennium Journal of Education, Technologies and Health, Journal of Microbiology, Biotechnology and Food Science, Journal of Academic Food);

2) experts in the evaluation of national and international projects;

3) experts in international organizations and institutions.

Participation in international organizations, editorial boards of scientific journals, various international projects and expert work promote the dissemination of research results, integration of research findings into study courses, student involvement in research projects and information of students about research trends in the field, including food industry activities, student involvement in international events (organization and participation in conferences, etc.). Various activities promote cooperation and exchange of experience between lecturers and students.

The beneficiaries of international cooperation are all study direction programmes, especially doctoral programmes.

Further cooperation is aimed at more intensive involvement of doctoral students in research, acquiring LLU Research programme funding and doctoral school grants, publishing research findings in scientific journals (food and wood processing fields) (including Q1 and Q2 issues), integration of research results into the study process, development of new research project applications (Horizon 2020, etc.), research and science popularisation in the international area and national scale (Europeans Researcher's Night, international food exhibition RigaFOOD, etc.), integration of science and research in the study process (especially Master's and Doctoral studies), wider use of new cooperation contacts for the elaboration of new international projects.

**4.4. Specify the way how the higher education institution/ college promotes the involvement of the teaching staff in scientific research and/or artistic creation. Provide the description and assessment of the activities carried out by the academic staff in the field of scientific research and/or artistic creation relevant to the study direction by providing examples and the summary of the quantitative data on the activities in the field of scientific research and/or artistic creation relevant to the study direction over the reporting period, for instance, the publications, participation in conferences, activities in the field of artistic creation, participation in projects by the academic staff members, etc., by listing the aforementioned according to the relevance.**

The research work of the academic staff is related to the study courses taught, scientific interests and current events in the field of food and wood materials, and artistic creativity in the field of design.

The involvement of the teaching staff in the research takes place:

1) following calls for proposals for research programmes and projects;

2) through invitations to participate in the preparation of project applications and implementation of projects by co-operation partners (Latvian, foreign partners);

3) by participating in the organisation of international scientific conferences, international scientific events;

4) activating the cooperation that has developed within the framework of mobility;

5) through personal contacts, etc.

Lecturers of the study direction prepare and publish articles in issues that are indexed in SCOPUS and Web of Science databases, peer-reviewed international publications, conference proceedings, prepare study materials, books, and scientific monographs. During the reporting period, LLU lecturers involved in the implementation of the study programme prepared 1191 publications, including 704 published in the SCOPUS and WoS databases. The results have been published in the following journals:

1) food journals: *Foods, Innovative Food Science & Emerging Technologies, Croatian Journal of Food Science and Technology, European Food Research and Technology, International Journal of Food Science and Nutrition, Current Nutrition & Food Science, Nutrition and Food Science, Nutrients, Medicine, International Breastfeeding Journal, Annals of Nutrition and Metabolism, Public Health, Journal of Food & Nutrition and Population Health*;

2) journals related to the fields of chemistry, agriculture, and the environment: *Chemical Technology, Acta Horticulturae, Agronomy Research, Sustainability, Journal of Food, Agriculture and Environment, Journal of Chemistry and Chemical Engineering, Chemistry, European Journal of Lipid Science and Technology, Acta Agriculturae Scandinavica, Acta Universitatis Agricultural et Silviculturae Mendelianae Brunensis, Frontiers in Environmental Sciences*;

3) journals related to timber and materials: *Bio Resources, Forest Ecosystems, Forests, Wood Material Science & Engineering, European Journal of Wood and Wood Products, Drvna Industry, Drewno, iForest, Baltic Forestry, Engineering for Rural Development, Recent Composites, European Journal of Forest Research, Wood Material Science & Engineering, Canadian Journal of Forest Research*.

The academic staff actively participates in scientific conferences (in Latvia and abroad), organises international conferences (FoodBalt, Nutrition and Health, Rural Environment, Education, Personality, Science and Practice for Forest Industry Development). The participation of academic staff in conferences/congresses is summarized in CV.

The academic staff involved in the implementation of study programmes participate in the implementation of national and international projects; the following examples illustrate the activity and involvement of lecturers in research:

1. The project of the state research programme “Sustainability of Agricultural Resources for the Production of Quality and Healthy Food in Latvia (AgroBioRes, 2014-2018)” was implemented by 16% of the lecturers of the study direction;
2. Framework project FP7 KBBE 2013-7-613781 “Enhancing of legumes growing in Europe

through sustainable cropping for protein supply for food and feed (EUROLEGUME)" (2014-2017), implemented by 4% of lecturers of study direction;

3. The project of the EEA Norwegian Financial Mechanism (EEA and Norway Grants) NFI/R/2014/11 "Innovative solutions for the use of hulled oats and barley and triticale for human health" (2015-2016) was implemented by 7% of the lecturers of the study direction;
4. COST Action CA18101 project "Sourdough biotechnology network towards novel, healthier and sustainable food and bioprocesses" (2018-2021) is implemented by 2% of lecturers of study direction;
5. The ERANET project ERASysAPP "Systems biology platform for the creation of lean-proteome *Escherichia coli* strains" (2015-2018) was implemented by 4% of lecturers of study direction;
6. The European Maritime and Fisheries Fund project 16-00-FP1101-000005 "Production of structured fish mass from Baltic Sea fish and its use in fish products" (2017-2018) was implemented by 8% of lecturers of the study diretion;
7. COST Action FP 1407 project "Understanding Wood Modification through an Integrated Scientific and Environmental Impact Approach (ModWoodLife)" (2015-2019) was implemented by 1% of the lecturers of the study direction;
8. COST FP1404 project "Fire Safe Use of Bio-based Building Products" (2014-2018) was implemented by 1% of the lecturers of the study direction;
9. National Research Programme 2014.10-4/VPP-6/6 "Research of forest and subsoil assets, sustainable use - new products and technologies" (ResProd) (2014-2017) sub-project "Research of forest and subsoil assets, sustainable use - new products and technologies" was implemented by 4% of the lecturers of the study direction;
10. ERASMUS+ K2 "Up-skilling construction workers in wood construction methods for energy-efficient buildings" (UPWOOD) (2020-2021) project is implemented by 2% of lecturers of the study direction;
11. The project of the Forest Sector Competence Centre 1.2.1.1/16/A/009 "Validation of the latest bonding and protective decorative processing technologies for the production of high value-added wood products" (ERDF, 2016-2019) was implemented by 2% of lecturers of the study direction;
12. The project of the Forest Sector Competence Centre L-KC-11-0004 "Research of wood materials of increased ecological value" (ERDF 2012-2015) was implemented by 3% of the lecturers of the study direction;
13. ERASMUS+ 601123-EPP-1-2018-1-DE-EPPKA2-SSA project "Skills for the Baltic Wood industry - European Quality in Vocational Education and Training (SkilledUP)" (2018-2021) is implemented by 2% of the lecturers of the study direction.

Research projects are implemented in cooperation with teaching staff and researchers of LLU faculties, cooperation partners - Institute of Horticulture, Institute of Agricultural Resources and Economics, Forest and Wood Products Research and Development Institute, Riga Stradiņš University, for example,

1) EAFRD project No.19-00-A01612-000009 "Development of scientifically based fermented milk products from raw materials obtained from organic farming and their clinical research", which is implemented by various cooperation partners, including Latvia University of Life Sciences and Technologies, Riga Stradiņš University, etc.;

2) EAFRD project No. 18-00-A01612-000006 "Development of innovative medicinal foods for malnutrition/dysphagia patients, creating a new, nationally important product with high added value", implemented by various partners, e.g.: Latvia University of Life Sciences and Technologies, Riga Stradiņš University, etc.

LLU has developed and successfully evaluates the performance of leading researchers and

researchers, which is the basis for determining the remuneration of scientific performance, especially by promoting the preparation of high-level publications. Lecturers who participate in the implementation of the study programme are elected leading researchers or researchers.

In general, the activity of the academic staff involved in the implementation of the study direction in scientific research is high, see the list of scientific publications and patents in Annex 5. *List of publications and patents (LLU)*.

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

Student involvement in research is an integral part of the study process and important for the development of research in the study direction. Involvement is provided by:

1) within the framework of study courses, promoting the acquisition of research skills and the implementation of research work;

2) self-motivation of students and initiative in the implementation of research work (especially foreign students);

3) involvement of students in the implementation of research projects;

4) development of final works based on research in a specific topic/project or topicality in the field;

5) presentation of the research results at conferences;

6) publication of research results, etc.

The participation of students in **undergraduate study programmes** (academic bachelor's, professional bachelor's, 2nd level professional higher education study programmes) in research is very different, for example, students of the academic bachelor's study programme "Food Quality and Innovations", in which students have to develop and present products that include a research element (product development organization, chosen methods of analysis, the study of properties, shelf-life of products, etc.), is the "Research practice", in which implements the experimental development of the bachelor's thesis. The development of a bachelor's thesis is also implemented within the framework of projects or the research of a bachelor's thesis is the result of a project (contract).

The development of the diploma projects of the students of the professional bachelor's study program "Wood Processing" is carried out with the support of the projects implemented by the Forest and Wood Processing Research and Development Institute for the practical implementation of the research.

The lecturers of the study courses invite the students as executors in the implementation of research projects and the projects in the development of which the students participate are:

1) ERDF projects in activity 1.2.1.2/16/I/001 "Technology transfer program";

2) Forest Sector Competence Centre Ltd. in projects implemented under the operational programme "Growth and Employment" 1.2.1 specific support objective "Increase private sector

investment in R&D" 1.2.1.1. support for the measure "Support for the Development of New Products and Technologies within the Competence Centres" implemented by the Forest and Wood Processing Research and Development Institute;

3) contract research agreements with companies;

4) the implementation of projects financed by the European Agricultural Fund for Rural Development;

The diploma projects of the students of the 2nd level professional higher education study programme "Food Technology" have a research section, which encourages students to study the composition of the developed products, sensory properties, to specify the technological parameters for product quality assurance. Also, within the framework of concluded cooperation agreements with Latvian food producers, e.g., SC Rīgas dzirnavnieks, SC Latvijas Balzāms and others, students (scholarship holders of these companies) develop company-commissioned topics that include research elements.

The implementers of the study programmes also organize student research conferences, which take place both at the LLU level in the form of the international conference "Students on their way to science" (https://www.sws.llu.lv/) and organized by the faculties (http://www.ptf.llu.lv/lv/studentu-konferences and http://www.tf.llu.lv/lv/studentu-zinatniskas-konferences - *in Latvian*). Students present their research achievements at these events.

The involvement of students in **Master's studies** in research is more intensive, as Master's students participate in:

1) the implementation of projects financed by LLU (applied research projects, fundamental research projects);

2) Forest Sector Competence Centre Ltd. projects implemented under the operational program "Growth and Employment" 1.2.1 specific support objective "Increase private sector investment in R&D" 1.2.1.1. support for the measure "Support for the Development of New Products and Technologies within the Competence Centres" implemented by Forest and Wood Processing Research and Development Institute;

3) State research programme "Agricultural resources for sustainable production of quality and healthy food in Latvia" (AgroBioRes) implementation;

4) National Research Programme "Forest and earth entrails resources: research and sustainable utilization – new products and technologies (ResProd)" (AgroBioRes) implementation;

5) the implementation of projects financed by the European Agricultural Fund for Rural Development;

6) the implementation of projects financed by the European Maritime and Fisheries Fund;

7) Latvian Food Competence Centre projects implemented under the operational program "Growth and Employment" 1.2.1 specific support objective "Increase private sector investment in R&D" 1.2.1.1. support for the measure "Support for the development of new products and technologies within the competence centres", which are implemented by entrepreneurs in cooperation with the Faculty of Food Technology of LLU;

Small business owners with the aim to acquire research-based knowledge, also study in master's studies.

**In doctoral studies**, PhD students participate in the implementation of research projects

(executors), strengthening research skills (acquisition of research methods, approbation), processing and analysis of results, skills of presentation of research results and preparation of scientific articles. Within the framework of research projects, a doctoral thesis is developed. There are opportunities for the doctoral student, in cooperation with the supervisor, to prepare and submit a project application in project competitions. More often doctoral students participate or implement the following projects:

1) LLU funded projects (applied research, fundamental research projects, doctoral grants), for example, LLU research programme projects "Variations in fatty acid composition of human milk" (2020-2022), "Biotechnological solutions for lactobionic acid production" (2018-2020), "The influence of high pressure technology on pork quality" (2017-2019), "Development of special dietary foods with high bioavailability (2017-2019), totally, 25 projects are elaborated with doctoral students active participation;

2) Forest Sector Competence Centre Ltd. projects implemented under the operational program "Growth and Employment" 1.2.1 specific support objective "Increase private sector investment in R&D" 1.2.1.1. support for the measure "Support for the Development of New Products and Technologies within the Competence Centres" implemented by Forest and Wood Processing Research and Development Institute;

3) State research programme "Agricultural resources for sustainable production of quality and healthy food in Latvia" (AgroBioRes) project Nr 4. “Sustainable use of local agricultural resources for development of high nutritive value food products (Food)” (2014-2018);

4) State research programme "Forest and earth entrails resources: research and sustainable utilization – new products and technologies (ResProd)" (AgroBioRes) project Nr. 3 "Biomaterials and products from forest resources with versatile applicability";

5) projects financed by the European Agricultural Fund for Rural Development, for example, ELFLA Nr. 18-00-A01612-000006 "Development of medical food for patients of malnutrition/dysphagia, creating new, nationally significant products with high added value";

6) projects of the 7th European Framework Programme Nr. FP7 KBBE-2013-7-613781 "Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed (EUROLEGUME)";

7) Latvian Food Competence Centre projects implemented under the operational program "Growth and Employment" 1.2.1 specific support objective "Increase private sector investment in R&D" 1.2.1.1. support of the measure "Support for the development of new products and technologies within the competence centres", which are implemented by entrepreneurs in cooperation with the Faculty of Food Technology of LLU.

Doctoral students also perform voluntary work within Operational Program "Growth and Employment" 1.1.1. the specific support objective "To increase the research and innovative capacity of Latvian scientific institutions and the ability to attract external funding by investing in human resources and infrastructure" 1.1.1.2. in the projects of the measure "Support for Postdoctoral Research", for example, PD5 "Whey processing in added value products for food and feed production". The involvement of students in research is also confirmed by the status of their co-authors in scientific publications.

**4.6. Provide a brief description and assessment of the forms of innovation (for instance, product, process, marketing, and organisational innovation) generally used in the study**

**direction subject to the assessment, by giving the respective examples and assessing their impact on the study process.**

In study direction, LLU applies various forms of innovation - marketing innovations, organizational innovations, process innovations, product innovations.

LLU uses a wide range of **marketing** tools (microblogging platform, various social networks, photo and video sharing applications, YouTube, etc.) to address applicants and inform students. The websites of LLU and the Faculties have been renewed and improved (unified style, structure), which facilitates the search for information, advertising campaigns are dominated by digital media, LLU Express news created on the LLU portal, also online Open Door Days.

During the reporting period, the organization of e-studies was improved (**process innovations**), there is the emphasis on conducting classes in e-studies (video lectures), which can be recorded and listened again for a better understanding of the topic. During online classes, students can present independent work, participate in seminars, discussions and group work, submit homework, assignments, take tests using tools of e-studies. In the e-studies environment, descriptions of the study courses, necessary materials, self-control questions, and links to some topical information for learning study course topics are available. Lecturers create a book of students' assessments (performance), which students (individually) can follow the course, also individual communication and explanation of the assessments. The administration of the e-studies environment at the university is well organized, the administrator's consultations are available (in person, online or by correspondence), instructions and advice on issues related to the use of e-studies are available.

LLU has established the LLU Information System (LLU IS) (**organizational innovations**), which is a unified database of students and lecturers. This system allows to digitize several processes and document processing (certificates, orders, study agreements, their amendments, preparation of diplomas, input of grades – learning outcomes, collection of statistical data). LLU IS is integrated with e-environment and personal account, which provides students with information on progress, finances, obtained CP, application for free choice courses, assessment of lecturers, uploading the final theses, the account is aligned with the plagiarism tool for evaluation of the final thesis. The lecturer's account is aligned with the publication catalogue of lecturers and researchers created by the LLU Fundamental Library, lecturers can see the timetable, lists of students, review final theses, etc.

To improve work efficiency, LLU provides electronic applications for master studies for LLU undergraduate program graduates. To improve the efficiency of the document circulation in 2018 the document management system DVS Namejs was introduced, which ensures the management of correspondence, orders, contracts, certificates, procurement documents.

LLU students, lecturers and administrative staff are provided with a developed IT infrastructure and e-studies environment, which is a continuous process of further improvement for the rapid growth and development of this field.

Innovative solutions (**product innovation**) are introduced in the implementation of study courses, integrating research findings into studies and allow students to develop their own products.

## II - Description of the Study Direction (5. Cooperation and Internationalisation)

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

There is cooperation in the field of studies with governmental and non-governmental organisations, professional associations, universities, scientific institutions, and manufacturers. The main types and fields of cooperation:

- Development of Sector's policy - cooperation with governmental institutions, non-governmental and professional organisations - lecturers of study direction, participating in the work of the Nutrition Council of the Ministry of Health, actively take part in the development of normative documents, coordination of decisions and opinions, for example, Cabinet Regulation No. 127/2017 "Amendments to Cabinet Regulation No. 172 of 13 March 2012" "Regulations on nutritional norms for students of educational institutions, clients of social care and social rehabilitation institutions, and patients of medical institutions", etc. The lecturers of the study field are experts of the inter-institutional working groups of the Ministry of Agriculture (Food Hygiene, Genetically Modified Food, Food Additives, Flavourings, and Enzymes, Materials and Products for Food Contact, Natural Mineral and Spring Water, Drinking Water, Food for Special Groups (Food for babies and young children, foodstuffs for special medical purposes), vitamins and minerals in foods (fortified foodstuffs) and food supplements), Food labelling, Wine, Alcohol, and other alcoholic beverages);
- implementation of the study process with the support of employers and industry specialists - representatives of state institutions (Food and Veterinary Service, Ministry of Agriculture) work as guest lecturers, industry specialists (Ltd Latvijas piens, Ltd LatRaps, SC Hanzas Maiznīcas, Ltd Lāči, etc.), wood processing specialists (JSC Finieris, JSC "Latvia's State Forests", Latvian Forest Industry Federation, Latvian Association of Independent Timber Harvesting Companies, Latvian State Forest Research Institute "Silava", Lt Nakts Mēbeles, Forest and Wood Products Research and Development Institute, etc.) participate in the implementation of the study process, employers/industry specialists are members of the State Examination Commission, Master's Examination Commission, employers provide internships for students, implement study tours, establish scholarships (SC Rīgas Dzirnavnieks, SC Latvijas Balzāms), etc.;
- cooperation with scientific institutes - an opportunity to develop final work, using research opportunities/resource base (Institute of Horticulture, Scientific Institute of Food Safety, Animal Health and Environment "Bior", Forest and wood products research and development institute, Riga Technical University, Institute of Agricultural Resources and Economics, Latvian State Institute of Wood Chemistry);
- organisation of international scientific events (conferences, congresses) - in cooperation with Latvia University and Riga Stradiņš University and long-time supporters (Latvian Bakers' Association, SC Food Union, Ltd. Lāči, Ltd. Puratos Latvia, etc.) organise an international scientific conference "Nutrition and health", the International Baltic Food Science and Technology Conference "FoodBalt"; in cooperation with Latvian State Forest Research Institute "Silava" and the Latvian Academy of Agricultural and Forest Sciences International

Scientific Conference “Science and Practice for Forest Industry Development”;

- evaluation of the content of the study programmes - employers (JSC Latvijas Finieris, the Ministry of Agriculture, SC Latvijas Valsts meži, Latvian State Forest Research Institute “Silava”), industry professional associations (Latvian Agricultural Organisation Cooperation Council, Latvian Forest Industry Federation, Latvian Dairy Committee), also foreign experts (Wageningen University, Estonian University of Life Sciences, Tallinn University) participate in the evaluation of the curricula of the study programmes;
- other cooperation – members of Councils of Professors of other universities (LU Council of Professors of Chemistry Science, RTU Council of Professors of Material sciences), cooperation with other educational institutions, for example, with Riga Stradiņš University, implementing the bachelor’s study programme “Nutrition”, cooperation with Riga Technical University Olaines Mechanics and Technology College to ensure the continuity of education in food technology.

Cooperation partners are selected according to the profile of the study field - foodstuffs, wood materials/technologies, design. The cooperation is organised in different ways, such as participation in projects, the development of regulatory documents, teaching courses or their part, organisation of international scientific conferences, external evaluation of the study programmes, their performance and identification of weaknesses, employment of graduates, etc. Involvement of employers is organised as follows:

1) expert examination of the programmes from the point of view of employers;

2) employer surveys;

3) participation of employers in the implementation of the study programmes (giving lectures, providing resource base for the study process, including the development of the final work, review of the final work, recommendation of the topics of the final work, etc.);

4) sponsors in the organisation of scientific conferences.

The Internationalisation Plan of the LLU, developed in 2015, sets priorities and also envisages co-operation with higher education institutions of a similar study and research field in the EU and other countries, the field and sector of which correspond to this direction of study. The offer of international cooperation is abundant, LLU focuses on the partners for long-lasting and productive cooperation.

Information on the concluded cooperation agreements is summarised in Annex 2. *List of Cooperation Agreements (LLU).*

**5.2. Specify the system or mechanisms, which are used to attract the students and the teaching staff from abroad and provide a description of the dynamics of the number of the attracted students and the teaching staff.**

To attract foreign students, LLU provides information on the study programmes offer in English, see http://www.llu.lv/en/degree-programmes, where a detailed description of each program is provided, including the study plan.

The LLU portal provides information on the admission process, see http://www.llu.lv/en/how-to-apply, also information on the immigration procedure, see http://www.llu.lv/index.php/en/immigration and other. In order to attract foreign students, LLU

implements various marketing activities, agreements are signed with recruitment agents, providing for the evaluation of their work efficiency, e-marketing, participation in international education fairs, agent forums. LLU is a member of the Latvian Higher Education Export Association (AIEA) and participates in its organizing activities.

The mechanism for the popularization of LLU studies is implemented with the participation of ERASMUS+ mobility programme, where LLU students and lecturers are ambassadors of the university, also students and lecturers entering within ERASMUS+ mobility and LLU foreign students are LLU promoters.

In addition, the ERDF project implemented by LLU No. 8.2.2.0/18/A/014 "Improvement of LLU academic staff" (2019-2022) helps to attract foreign professors in the implementation of the study process. The dynamics of foreign students and lecturers are summarized in Annex 7.

During the reporting period, the education of foreign students was implemented in the study direction "Production and Processing" in the master's study program "Food Science". The right to implement the program in a foreign language has also been acquired by the academic bachelor's study program "Food Quality and Innovations", in the reporting period the training of foreign students has not been implemented in this programme. In 2019, LLU signed a cooperation agreement with the Samarkand Institute of Veterinary Medicine (Uzbekistan), which envisages educating the students of this university in the academic bachelor's program "Food Quality and Innovations" after competition of 1st study year at the Samarkand Institute of Veterinary Medicine. The training of foreign students in this programme is planned for the study year 2021/2022.

**5.3. In the event that the study programme entails a traineeship, provide a description of the traineeship options offered to the students, as well as the provision, and work organisation. Specify whether the higher education institution/ college provides assistance in finding traineeships.**

The organisation of the internship takes place in accordance with the LLU Internship Regulations (https://www.llu.lv/lv/studiju-prakses - *in Latvian*). The study programmes have several internships: study (didactic), professional (production), and research.

**Study (didactic) internship** is organised under the supervision of the teaching staff in accordance with the study plan.

**For professional (production) internship**, in accordance with the study plan, students are allocated based on the concluded tripartite agreement on the implementation of the internship.

The student chooses the internship place independently, evaluating the requirements of the internship programme, and coordinates with the internship supervisor. Support in finding and selecting internship places is provided by internship supervisors, study programme directors, and can also be recommended by supervisors of final works or lecturers.

Every year, the faculties also receive internship offers from cooperation partners, as well as other companies. For students, information about the offered internships is available at the faculties Information desk, study programme directors and lecturers also inform students orally or by e-mail; e-study courses also contain information about the internship offers.

The offer of internship places is available on the LLU website, in the section *Work and internship offer* (https://www.llu.lv/lv/darba_piedavajumi/view_practice - *in Latvian*). The internship offer is also

available on the websites of the faculties, for example, for the Faculty of Engineering (http://www.tf.llu.lv/lv/sadarbibas-partneru-darba-un-praksu-piedavajumi *in Latvian*).

In a professional internship, the student has two internship supervisors: a lecturer of the respective institute/department of the faculty and the person in charge of the internship company. Students have the opportunity of internship in foreign companies. In this case, the action is:

1) a tripartite agreement in English is concluded (see an example of the agreement in the Internship Regulations https://www.llu.lv/lv/studiju-prakses - *in Latvian*) and the dean's decree is prepared;

2) if the internship is within the framework of the ERASMUS+ programme, the documentation and the rector's decree regarding the assignment of students for the internship are prepared by the International Cooperation Centre of the LLU.

In the exchange programme, the student can participate in the internship during the studies and also within a year after graduation (5 students of the study direction used this opportunity). If the internship is within the framework of the ERASMUS+ programme, the student looks for an internship place themselves, but support can also be provided by the internship supervisor at the LLU, the director of the study programme, or another lecturer.

The International Cooperation Centre of the LLU, the director of the study programme, or the international relations coordinator of the faculty provides information about the internship places offered by foreign companies; students who had a foreign internship experience also share information about the internship placement, and there are ambassadors to promote mobility internships.

The student has the opportunity to change the place of the internship; in this case, the responsible person of the faculty prepares the dean's decree on the basis of the student's application for changing of the place of internship. The internship supervisor also prepares a new internship agreement.

During the internship, the student completes the internship programme (determined for each internship, for example, Internship instructions at the Faculty of Food Technology (http://www.ptf.llu.lv/sites/ptf/files/2020-04/Prakses_nolikums_2020.pdf - *in Latvian*) or see the Annex *Summary of study courses* of self-evaluation report of the study programmes) prepare an internship report in accordance with the internship programme and submit it to the internship supervisor together with the evaluation of the internship supervisor at the internship place. Public defence and evaluation of the internship take place under the guidance of the internship supervisor of the LLU, inviting lecturers of the profiling department/institute.

**The research internship** is managed by the programme director, who together with the student agrees on the internship placement, an order is prepared and a tripartite agreement is concluded between the LLU, the student, and the internship provider.

See the internship regulations and information on the concluded internship agreements in the Annexes.

**5.4. In the event that joint study programmes are implemented in the study direction, provide the justification of the creation of the joint study programmes and a description and assessment of the selection of the partnering higher education institutions by including information on the principles and the procedures for the creation and implementation of these joint study programmes. In the event that no joint study**

**programmes are implemented in the study direction, provide a description and assessment of the plans of the higher education institution/ college for the creation of such study programmes within the study direction.**
***(Not applicable)***

## II - Description of the Study Direction (6. Implementation of the Recommendations Received During the Previous Assessment Procedures)

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

In the previous accreditation of the study direction, experts assessed the study direction programmes as sustainable. Experts have provided recommendations and noted weaknesses for improving the quality of study direction programmes. The following is a list of expert recommendations:

1) to increase the number of foreign students in the study direction;

2) to increase the proportion of practical training in study programmes;

3) to increase the use of e-studies;

4) to strengthen lecturers' English language skills;

5) to increase the number of publications in internationally cited issues;

6) development and implementation of sustainable study programmes in the changing economic situation;

7) attraction of foreign financing;

8) greater emphasis on international cooperation, mobility, project implementation.

Weaknesses:

1) age structure of lecturers in separate study programmes;

2) insufficient study funding, which hinders the attraction of new lecturers.

In order to implement the recommendations and eliminate the weaknesses in each study programme, their significance in the context of the programme is analysed from the need for immediate implementation to gradual, including the annual analysis and evaluation of the implementation of expert recommendations. The implementation of the recommendations is reflected in the annual self-assessment reports of the study direction "Production and Processing". The implementation of expert recommendations and performance analysis are summarised in Table 6.1.1.

Table 6.1.1.

**Execution of recommendations of study direction experts**

| Recommendation | Description of execution / non-execution |
|---|---|
| 1. Increase the number of foreign students in the direction | The right to implement the academic master's study programme "Food Science" in English has been acquired. The decision of the Study Accreditation Commission 06.09.2019.<br>The right to implement the academic bachelor's study programme "Food Quality and Innovations" in English has been acquired. The decision of the Study Accreditation Commission No. 80-4 (13.06.2018).<br>It is planned to acquire the right to implement the doctoral study programme "Food Science" in English. |
| 2. Increase the proportion of practical training in study programmes | The distribution of theoretical and practical classes in academic bachelor's study programme "Food Quality and Innovations", professional bachelor's study programmes "Wood processing" and "Design and Crafts", 2nd level professional higher education study programme "Food Technology" courses have been reviewed, practical and laboratory work and internship proportion have been increased, see the self-evaluation reports of the study programmes "Food Quality and Innovations", "Food Technology", "Design and Crafts" and "Wood Processing. |
| 3. Increase the use of e-studies | During the reporting period, the use of e-studies has significantly increased, moreover, in the spring semester of the study year 2019/2020 it has been implemented in the amount of 100% due to the epidemiological situation. |
| 4. Strengthen lecturers' English language skills | Improvement of foreign language skills of lecturers of the study direction has been implemented, moreover, 100% has been achieved in the master's study programme "Food Science" and the doctoral study programme "Food Science". |

| | |
|---|---|
| 5. Increase the number of publications in internationally cited issues | During the reporting period, the number of publications in internationally cited issues has significantly increased. |
| 6. Development and implementation of sustainable study programmes in the changing economic situation | During the reporting period, LLU has started ERDF project no. 8.2.3.0/18/A/009 "Improvement of the Management of Latvia University of Life Science and Technologies", within the framework of which the improvement of the study direction programmes was performed. The view of industry experts and foreign experts has helped to improve the performance of the study programmes.<br>Implementation of 2 study programmes in English has been started, a new professional bachelor's study programme "Design and Crafts" has been licensed, changes have been made to the content of the academic bachelor's study programme "Food Quality and Innovations", the name of the programme has been changed. |
| 7. Attraction of foreign financing | The increase in the number of foreign students has allowed to attract additional funding for the implementation of studies. The implementation of ERDF and ESF projects has allowed to modernize the study and research base for study direction programmes. |
| 8. Greater emphasis on international cooperation, mobility, project implementation | During the reporting period, the mobility of students and lecturers has significantly increased, international cooperation in the direction of studies and science with universities of European and Asian countries has been strengthened, international scientific projects have been implemented. |
| 9. Age structure of lecturers | During the reporting period, the age structure of lecturers has changed, the proportion of new lecturers has significantly increased, especially in the professional bachelor's study programme "Wood Processing". |

| | |
|---|---|
| 10. Insufficient study funding, which hinders the attraction of new lecturers | There were no significant changes in the financing of studies during the reporting period (see section 3.1.). It is worth noting the volume of projects financed by LLU, including the projects of the European Agricultural Fund for Rural Development at LLU, which allows to invite young scientists more purposefully in their implementation, thus strengthening the teaching staff. Significantly modernized study and research base, the establishment of new laboratories is attractive and motivating for the work of young specialists at the university, also projects implemented by LLU, e.g., ERDF project No. 8.2.2.0/18/A/014 "Improvement of LLU academic staff" has helped to improve lecturers' professional competencies (English language skills, information technology management skills, created opportunities for internships in companies in the field), and has facilitated the attraction of new specialists. |

The execution of recommendations of study direction experts is summarised in Annex 3.

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

During the reporting period, the professional bachelor's study programme "Design and Crafts" was licensed and included in the study direction "Production and Processing", license No. 04056-88 (March 30, 2016).

Changes have been made to the academic bachelor study programme "Food Quality and Innovations" by changing the name of the study programme from "Food Science" to "Food Quality and Innovations", and the right to implement the programme in English has been acquired (Decision of the Study Quality Commission No. 80-A (13.06.2018.)).

Changes have been made to the academic master's study programme "Food Science", acquiring the right to implement the study programme in English (Decision of the Study Quality Commission No. 2019/13-I (06.09.2019.)).

The changes made are coordinated and included in the accreditation paper of the study field No. 2020/27 (March 25, 2020).

When licensing the professional bachelor study programme "Design and Crafts", experts have provided recommendations and suggestions for the improvement and development of the program, see Table 6.2.1.

Table 6.2.1.

**Expert recommendations for the implementation of the professional bachelor study programme "Design and Crafts"**

| Recommendation / objection | Execution |
|---|---|
| The demographic situation and the experience of other educational institutions raise concerns about student enrolment | Starting from 2016/2017, the number of students willing to study and enrolled students has gradually increased during the study year (see section 1.2 and Annex 5 of the programme self-evaluation report) |
| In order to meet the standard requirements of the product designer profession, the study programme must abandon the field of textile technology and design studies, because it does not represent modern textile technologies and their implementation is disproportionately expensive; in the direction of wood and metal technologies and design, the quality of the design component must be ensured by redesigning the content of the courses and attracting teaching staff - qualified design specialists. | The opinion and recommendations of the experts have been taken into account for the staff implementing the study programme, including the evaluation of the implementation of the study courses, see Annex 9 of the programme self-evaluation report "Programme plan"). |

The recommendations of the expert evaluating the changes in the academic bachelor's study programme "Food Quality and Innovations" were on the implementation of separate study courses for foreign students, in which the issues of regulation of regulatory enactments are discussed, reducing the focus on national regulatory enactments. It was recommended to develop a mapping of study programme, which will help to reveal the correlations between the results of study courses and the results to be achieved by developing competency-based studies. The expert's recommendation has been implemented, see section 2.2 and Annex 8 of the programme self-evaluation report.

The recommendations of the expert evaluating the changes in the academic master's study programme "Food Science" were on the inclusion of the Latvian language in the compulsory part of the programme (see Appendix 9 of the study programme self-evaluation report) and clarification of study course descriptions, which were arranged before the decision of the Study Quality Commission was made (6.09.2019).

# Annexes

| | | |
|---|---|---|
| I. Information on the Higher Education Institution/ College | | |
| List of the governing regulatory enactments and regulations of the higher education institution/ college | 1_dala_1_pielikums_EN_Main internal legal acts and regulations (1).docx | 1_dala_1_pielikums_Galveno_normativo_dokumentu_saraksts (8).docx |
| Information on the implementation of the study direction in the branches of the higher education institution/ college (if applicable) | | |
| Management structure of the higher education institution/ college | 2_Pielikums_LLU_management_structure_EN (1).docx | 2_Pielikums_LLU_parvaldibas_shema_LV (1).docx |
| II. Description of the Study Direction - 1. Management of the Study Direction | | |
| Plan for the development of the study direction (if applicable) | Annex 1. Development plan of the study direction.pdf | 1.pielikums. Studiju virziena attīstības plāns.pdf |
| Management structure of the study direction | Study direction management structure Production and Processing.pptx | Studiju virziena pārvaldības struktūra Ražošana un pārstrāde.pptx |
| II. Description of the Study Direction - 3. Resources and Provision of the Study Direction | | |
| Basic information on the teaching staff involved in the implementation of the study direction | List of teaching staff.xlsx | Macibspeku_saraksts.xlsx |
| Biographies of the teaching staff members (in Europass Curriculum Vitae format) | Teaching staff_CV.rar | Mācībspēku_CV.rar |
| Summary of the statistical data on the incoming and outgoing mobility of the teaching staff over the reporting period | Annex 4. LLU lecturers and foreign lecturers mobility Production and Processing.pdf | 4. pielikums. Ārzemju docētāju un LLU docētāju mobilitāte Ražošana un pārstrāde.pdf |
| II. Description of the Study Direction - 4. Scientific Research and Artistic Creation | | |
| List of the publications, patents, and artistic creations of the teaching staff over the reporting period | Annex 5. List of publications, patents and creative art activities.pdf | 5. pielikums. Publikāciju, patentu un mākslinieciskās jaunrades saraksts RP.pdf |
| II. Description of the Study Direction - 5. Cooperation and Internationalisation | | |
| List of cooperation agreements | Annex 2. List of cooperation agreeements _LLU.pdf | 2. pielikums. Sadarbības līgumu saraksts Ražošana un pārstrāde.pdf |
| Statistical data on the teaching staff and the students from abroad | Annex 7. Foreign lecturers and students in the study direction.pdf | 7. pielikums. Ārvalstu docētāji programmā_RP.pdf |
| Statistical data on the mobility of students (by specifying the study programmes) | Students mobility statistics.pdf | Statistikas dati par studējošajo mobilitāti.pdf |
| Description of the organisation of the traineeship of the students | Internship_regulation_2014_2018_LV_EN (1) (1).pdf | Praksu_nolikums_ar_2014_2018-1 (1).pdf |
| Information on the agreements and other documents confirming the traineeship of the students in companies | Cooperation agreements_internship.pdf | Noslēgtie sadarbības līgumi_prakses.pdf |
| II. Description of the Study Direction - 6. Implementation of the Recommendations Received During the Previous Assessment Procedures | | |
| Overview of the implementation of the provided recommendations | Annex 3. Execution of recommendations of study direction experts_Production and processing.pdf | 3. pielikums. Rekomendāciju izpildes pārskats_R&P.pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Confirmation signed by the rector, director or the head of the study programme or the study direction of the higher education institution/ college which states that the official language proficiency of the teaching staff involved in the implementation of the relevant study programmes of the study direction complies with the regulations on the level of the official language knowledge and the procedures for testing official language proficiency for performing professional duties and office duties. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | Annex_1_Students_statistics_WOOD_PROCESSING.pdf | 1_Pielikums_Studentu_statistika_KOKAPSTRADE.pdf |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | Annex_6_WOOD_PROCESSING_compliance_with_the_state_education_standard.pdf | |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | Annex_7_The_compliance_of_the_study_programme_WOOD_PROCESSING_with_profession_standard.pdf | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | | |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | SV - Pielikums nr9 (1).docx | Studiju_plans_KOKAPSTRADE_PL_NPL_Akreditacija.pdf |
| Descriptions of the study courses/ modules | Study_course_descriptions_WOOD_PROCESSING.pdf | 9_pielikums_programmas_LV_pilns laiks.rar |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | | Bakalaura diploms un pielikums.zip |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | | |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | | |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | | |
| Sample (or samples) of the study agreement | | |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | | |
| Description of the Study Direction - Other mandatory attachments | | |

| | | |
|---|---|---|
| Electronically signed application form for assessment of a study direction | Iesniegums_studiju_virzienam_Razosana_parstrade_novertesanai_EN_change.docx | Iesniegums_studiju_virzienam_Razosana_parstrade_novertesanai_precizets.edoc |

# Other annexes

| Name of document | Document |
|---|---|
| LLU Dokumenti latviešu valodā | LLU Dokumenti latviesu valoda.zip |
| LLU Documents in English | LLU Documents in English.zip |
| ps0171 pārtikas tehnologs 2003.pdf | ps0171 pārtikas tehnologs 2003.pdf |
| Precizejumi_zinojumam_Ražošana un pārstrāde.docx | Precizejumi_zinojumam_Ražošana un pārstrāde.docx |

# Food Technology (42541)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Food Technology* |
| Education classification code | *42541* |
| Type of the study programme | *Professional bachelor study programme* |
| Name of the study programme director | *Evita* |
| Surname of the study programme director | *Straumīte* |
| E-mail of the study programme director | *evita.straumite@llu.lv* |
| Title of the study programme director | *Dr.sc.ing.* |
| Phone of the study programme director | *+37129136101* |
| Goal of the study programme | *The aim of the 2nd level professional higher education study program “Food Technologies” is to prepare food and beverage technologists by providing them with high-quality higher professional education so that they can manage, plan, organize, control and improve technological processes in food and beverage companies.* |
| Tasks of the study programme | *1. to provide theoretical knowledge and practical skills to prepare professionals who organise, manage and produce quality, healthy and safe foods for consumers;*<br>*2. to develop the skills of independent work and abilities to orientate according to the compliance of raw materials, auxiliary materials, packaging materials, labelling, and selected technological process parameters for food production;*<br>*3. to develop the ability to monitor and coordinate the progress of technological processes at all stages of the technological process;*<br>*4. to develop skills to analyse technological and economic indicators of the production;*<br>*5. to promote professional skills in the implementation, maintenance and improvement of the company's quality management systems.* |

| | |
|---|---|
| Results of the study programme | *Students acquire the knowledge necessary for the performance of the basic tasks of professional activity:*<br>*1. are able to integrate the acquired knowledge of fundamental and general education study courses in the fields related to food production;*<br>*2. are able to demonstrate comprehensive theoretical knowledge and practical skills in the application of engineering solutions, new product development and quality control in food production.*<br>*Students acquire skills:*<br>*1. ability to compile, systematise and analyse production-related indicators, explain and provide reasonable solutions;*<br>*2. ability to integrate knowledge of the latest trends in food production and related fields, improving the production processes and their monitoring;*<br>*3. ability to cooperate, work in a team, organise and manage the work of other employees;*<br>*4. ability to independently formulate tasks for production staff, managing and supervising production processes.*<br>*Food and beverage technologists will be competent*<br>*1. to integrate knowledge of various fields in product production and also development and monitoring of quality systems;*<br>*2. to apply the acquired knowledge and skills in the organisation of product production processes, product packaging and quality assurance;*<br>*3. to objectively evaluate and use the latest information for the development of new products or optimization of existing ones in food production;*<br>*4. to orientate in legal frameworks, normative documents and quality systems, for safe and secure food production;*<br>*5. to comply with occupational safety regulations, to assess the impact of professional activities on the environment and society.* |
| Final examination upon the completion of the study programme | *State examination and Diploma project* |

# Study programme forms

**Full time studies - 4 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *4* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | - |
| Qualification to be obtained (in english) | *Food and Beverage Technologist* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Part time extramural studies - 5 years - latvian**

| | |
|---|---|
| Study type and form | *Part time extramural studies* |
| Duration in full years | *5* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *-* |
| Qualification to be obtained (in english) | *Food and Beverage Technologist* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

## 1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction

The study program is organized in accordance with the laws and regulations of the Republic of Latvia (LAT) and the provisions of the professional standard PS 0171 “Food and Beverage Technologist”.

During the accreditation period, the full-time and part-time study program “Food Technology” was improved and changes in the study courses were made in accordance with the general principles of the LLU development strategy and the demand for various knowledge in the labour market.

**Academic year 2014/2015**

In order to improve and optimize the study process, changes have been made in several study courses:

1. the number of credit points for the study course Sociology has been increased from 1.5 CP to 2.0 CP;
2. the number of credit points for the study course Automation has been reduced from 2.5 CP to 2.0 CP;
3. the study course Psychology”(1.5 CP) has been replaced by the study course Management Psychology with the amount of 2.0 CP;
4. the general education study course Introduction to Studies (0.5 CP) has been excluded from the full-time study plan, integrating its content into the content of the study practice Basics of the Food Industry (2.0 CP).
5. in part-time studies the total number of credit points for study practice Food Quality Management has been reduced from 14 CP to 12 CP;
6. a new compulsory study course Food Additives (2.0 CP) has been created.

**Academic year 2015/2016**

In order to improve the knowledge and skills required for the development of the diploma project, the volume of the course work Food Technological Equipment was increased from 1.5 CP to 2.0 CP.

In order to optimize the study courses, three course papers each 1.5 CP were combined – Entrepreneurship in the Food Industry, Food Production Technology and Food Technological Equipment, creating a single course Study Paper in Food Production Design (4.0 CP). The advantage of such combination is that these are not separate projects anymore and it promotes better understanding of the food business operation.

**Academic year 2016/2017**

Changes have been made in the structure of internships, adding the internship Basics of Food Industry in the amount of 2.0 CP. During the internship Basics of Food Industry students acquire knowledge about study procedures at Latvia University of Life Sciences and Technologies (LLU), get acquainted with the distribution of the academic year, students' rights and obligations, LLU

Fundamental Library operating principles, get acquainted with the food production companies and industry specialists, as well understands his / her rights, duties and responsibilities at LLU and beyond. The total CP amount of internships has also been changed:

1. internship Food Equipment – the amount has been reduced from 4.0 CP to 3.0 CP;
2. internship Food Technology – the amount has been reduced from 4.0 CP to 3.0 CP;
3. internship Food Quality Management II – the amount has been reduced from 10.0 CP to 8.0 CP.

Since the academic year 2016/2017, no changes have been made in the study courses regarding their credit point amount or the creation of new study courses, but study course content has been improved to provide the necessary knowledge, which is required in the labour market.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

The number of students in the study program "Food Technology" in the period from 2013/2014 until 2019/2020 the study year has a tendency to decrease (Annex 5, Figures 5.1 and 5.2). This is not related to the decrease in the quality of studies, but to the general tendencies in Latvia - demography, economic situation, emigration of the population from the state and the preference of secondary school / gymnasium graduates in the humanities. Therefore, more attention is paid to work with schools, teachers and students, organising informative events about study and career opportunities, as well as consulting school research works.

The most significant decrease in the number of full-time study students is typically observed after the first academic year, when only 54.0–78.0% of students continue their studies, but no significant decrease in the number of students is observed in the further study courses (Annex 5, Figure 5.4). The main reasons to discontinue the studies:

1. some of the potential students who had applied for studies do not sign the study agreement or change their choice (do not want to link their future with food technology). This is due to the fact that potential students have the opportunity to apply for several study programs, which many also use. After learning the results, applicants choose either an easier field of study or the one closer to home.
2. it is not possible for all students to receive a scholarship granted by government, or the scholarship is insufficient (99.60 EUR), therefore students start working in the first academic year. It is often not possible to combine work with full-time studies. Consequently, students choose to take an academic leave of absence or discontinue their studies. Currently, the situation is stabilising and students are resuming their studies after a longer break or resuming their studies as part-time option.

Evaluating the number of part-time students in the study program, it can be concluded that 9-16 students start their studies every year. During the academic year 2019/2020, no students applied for the part-time studies. Part-time students combine their studies with work that can complicate a the study process, then these students also use an academic leave of absence more often. Every year 7–8 students graduate from part-time studies.

There is a tendency that the number of breaking of studies tends to decrease.

The dynamics of the number of graduates is closely related to the number of enrolled students and it is variable, but with a noticeable tendency to stabilise.

Part-time students pay tuition fees, they study at private expense, or their employers finance the studies. In turn, full-time students are provided with state-financed places. However, in 5-12 cases, full-time students also have to pay a tuition fee, if the study courses are not passed in the respective semester.

### 1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.

The study program “Food Technology” has been developed on the basis of the valid professional standard Food and Beverage Technologist (qualification level 5), which was approved by the Ministry of Education and Science Order No. 187. (https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0171.pdf - only Latvian)

There is a close connection between the title of the study program "Food Technology", the professional qualification to be obtained, the aims and tasks of the study program, the learning outcomes and the requirements for enrolment. As our graduates are awarded the qualification of food and beverage technologist, prior to application for studies it is mandatory to successfully pass the state centralized exam (CE) in Latvian language, mathematics and a foreign language (English, German, French or Russian). The assessment of a foreign language may be replaced by the assessment of an international test (Regulations of the Cabinet of Ministers of the Republic of Latvia No. 543/2015). CE in chemistry is also mandatory or a final mark in chemistry or natural science is required. It is possible to get extra points if potential student has successfully passed CE in biology. These are the subjects that are necessary for successful completion of the studies in chemistry, mathematics and physics.

**The aim** of the study program “Food Technology” is to prepare food and beverage technologists by providing them with high-quality higher professional education so that they can manage, plan, organize, control and improve technological processes in food and beverage companies.

**Tasks** of the study program:

1. to provide theoretical knowledge and practical skills to prepare professionals who organise, manage and produce quality, healthy and safe foods for consumers;
2. to develop the skills of independent work and abilities to orientate according to the compliance of raw materials, auxiliary materials, packaging materials, labelling, and selected technological process parameters for food production;
3. to develop the ability to monitor and coordinate the progress of technological processes at all stages of the technological process;
4. to develop skills to analyse technological and economic indicators of the production;
5. to promote professional skills in the implementation, maintenance and improvement of the company's quality management systems.

Graduates of the program acquire comprehensive theoretical and professional work skills, which enable them to choose a job in food production, food control and surveillance according to their interests. Graduates are competent and knowledgeable in food production and development of new

products, can be employed in food-related trade companies, advisory services, research and training institutions, as well as be experts in the state control services, ministries and other institutions.

The qualification - food and beverage technologist - is obtained after the successful completing of the theoretical and practical courses of the second level professional higher education study program “Food Technology”, development and defence of a Diploma project with the State Examination Commission.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master’s and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The study program “Food Technology” (full-time and part-time studies) is designed to prepare the necessary specialists for Latvian, European and world food production companies - food and beverage technologists.

Every year, leading specialists in the field are invited to review diploma projects and to be members of the State Examination Commission. Thus, it is possible to get feedback on the relevance of the selected diploma project topics for food production and the weak points in the study process that should be improved.

Since today the quality certificate (ISO 22000, FSSC 22000, BRC, IFS, etc.) is an integral part of any food company that wants to export its products, the study course Food Quality Management has been revised to include the current issues, which are important for food production companies. Students are learning various quality management systems in a field specific professional study courses, for example: Food Additives, Milk, its processing I and II, Grains their Processing I and II, etc. New processing technologies are entering food production - lyophilisation, microwave-vacuum drying, automation, high pressure technologies, etc. - and the related equipment. Therefore, in various study courses, students are introduced to the latest equipment and processes in the industry. Packaging plays an essential role in the food industry - it protects the product from the external environment, as well as provides the consumer with safe food during its shelf life. In the study course Food Packaging, students are given knowledge not only about the types of packaging, but also about the materials used in production of packaging and their suitability for food packaging. Students obtain the qualification of food and beverage technologist, therefore during the accreditation period the study courses Engineering Graphics I and II and Fundamentals of Construction have been revised, in which more emphasis is placed on the drawings of production premises layout using various software. Students further use this knowledge to create the graphic part of the diploma project. The content of the sections included in the diploma project has been

updated so that students pay more attention to the use of new technologies, analysis of competitors' products and economic evaluation of the project.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The full-time and part-time study courses of the study program “Food Technology” are designed to acquire, first, the general education study courses, then the field specific professional specialisation courses. In this way, the aim of the study program is ensured - to prepare food and beverage technologists by providing them with high-quality higher professional education so that they can manage, plan, organize, control and improve technological processes in food and beverage companies. Full-time studies are organised as four-year studies, but part-time studies - five years.

**Full-time studies**:

**1st academic year**

The first year of studies is dedicated to the acquisition of general study courses (Biology of Food Raw Materials, Ecology and Environmental Protection, Professional English or German, Philosophy, Ethics, Aesthetics), as well as theoretical courses in the field (Informatics, Inorganic and Analytical Chemistry, Engineering Graphics, Mathematics, Physics and Theoretical Mechanics). In this academic year, the foundations of theoretical knowledge are laid, which will be necessary in the following study years for the acquisition of theoretical and professional specialization courses in the field. In the first academic year there are two internships (study internship Basics of Food Industry and production practice internship Introduction to Food Industry), in which students have the opportunity to get acquainted with the organization of the study process at LLU and PTF, as well as get acquainted with the daily life of a food company.

**2nd academic year**

In the second academic year, the general education courses Economic Theory, Sociology, Management Psychology, Labour and Civil Protection are acquired, which provide theoretical and practical experience that will be useful in a practical work in the food industry. Students consolidate their knowledge in the theoretical courses of the field (Physical and Colloidal Chemistry, Organic Chemistry and Biochemistry). In the second year of studies, students also acquire field specific professional specialisation courses (Basics of Electrical Engineering, Applied Mechanics, Automation, Food Processes and Equipment, Food Heat and Cold Processes). After the second year of studies, the internship Food Equipment is planned, in which students have the opportunity to strengthen the theoretically acquired knowledge in food production companies.

**3rd academic year**

In the third year of studies, students take the professional specialization courses Construction Basics, Food Packaging, Microbiology, Food Sensory Evaluation and Food Processes and Equipment, Entrepreneurship in the Food Industry. These are study courses that include general basic knowledge that will be required for the further study courses, as well as work in food production

companies. In the third year of studies, students begin to acquire specialization study courses (Milk, its processing, Meat, its processing, Grains, their processing, Fruits, vegetables, their processing, Fish, their processing), which give knowledge about the raw materials used in the production of various food products. their quality and technological processes. The acquired knowledge is consolidated in the internship Food Technology organized in food production companies.

**4th academic year**

In the fourth academic year, the acquisition of field specialisation study courses continues, study work in food plant design is developed, in which it is necessary to use previously acquired knowledge in various study courses related to food production technologies (Milk, its processing, Meat, its processing, Grains, their processing processing), Food Technology Equipment and Entrepreneurship in the Food Industry) and internships. There are two internships in this academic year. One is the internship Food Quality Management I, where students have the opportunity to get acquainted with various food production companies, logistics and surveillance institutions. The other is the production internship Food Quality Management II, in which students get acquainted with the management, supervision and corrective measures of the quality management systems of a food production company.

**Part-time studies** are organized within five academic years according to an analogous plan as full-time studies, with the following differences:

- During the studies there are two internships - Food Equipment and Technology (12.0 CP, 8th semester) and Food Quality Management (11.0 CP, 10th semester). It allows to assure that part-time students strengthen their theoretical knowledge in food production companies in the amount of 23.0 CP.
- The state exam and diploma project are developed in the fifth academic year, when students have completed a field specialisation course and are able to demonstrate the knowledge and skills acquired during studies related to food production, its organization and management of the technological processes.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

According to the Study Regulations of the Latvia University of Life Sciences and Technologies (Decision No. 8-182 of the Senate of the Latvia University of Life Sciences and Technologies, 10.06.2015.), students' knowledge is assessed according to two indicators - qualitative and quantitative. For the qualitative assessment, the 10-point scale criterion or the assessment passed or failed is used. The quantitative indicator is the volume of the study course expressed in credit points.

The following forms of control are used to assess students' knowledge - defence of the laboratory work, tests, reports, course paper / project, defence of the study work, test and exam. During the acquisition of each study course, the student must pass the examinations specified in the study course program - tests and / or laboratory works and / or practical works and / or independent work.

Acquisition of the study course ends with a formal test - a formal test, a formal test with a grade or an examination. The type of examination may be a written, oral or mixed examination, in which the lecturer or the commission assess the knowledge and skills acquired in the study course or its part. The examination can be taken by a student who has fulfilled all the requirements of the program, otherwise there is no right to take the examination. The cumulative examination is also practiced in the study courses - the student's assessment is formed from the assessment of learning outcomes in the semester (tests, presentations, laboratory works, etc.). The formal test is a summary of the work completed within the study course during the semester, which is evaluated in accordance with the study plan. If the study course ends with a formal test with a grade or examination, the student receives a grade in a 10-point scale. Test evaluations are registered in the examination list and / or e-studies in the respective study course. Failure or failure to pass a test or exam, or defence of works, within the specified time (semester or session) is an academic debt. The rules and procedures for settling academic debts are regulated by the LLU Rector's Order No. 4.3.-8/64 (17.06.2019) on the procedure for collection of tuition fees and tuition debt settlement fees.

Various study course implementation methods are used in the implementation and acquisition of the study program “Food Technology” - lectures, video lectures, online lectures, laboratory and practical work (face-to-face and online), seminars, course work or project development, independent work, study tours and internships. In the study courses with the planned laboratory and practical work, students strengthen their communication skills and presentation skills, gain experience to present factual material or their opinion, as well as participate in discussions, work in a team. Work in seminars is also one of the mechanisms for controlling the success of students' independent work and acquisition of the study course. In order to bring the study process closer to practice, study courses (Food Processes and Equipment, Milk, its processing, Fruits, vegetables, their processing, Grains, its processing, Fish, its processing, Meat, its processing, etc.) are organised for learning specific topics that help students to better understand the organisation and flow of technological processes, design in the manufacture of food products.

In order to fully ensure the study process, teaching staff and students use e-learning system (Moodle tool) options in many ways (https://estudijas.llu.lv/ - *in Latvian* and https://estudijas.llu.lv/?lang=en *in English*). In March 2020, with the entry into force of restrictions on the spread of the Covid-19 pandemic, the use of the e-learning system increased significantly through the remote implementation of lectures, laboratory and practical work, defence, including the writing and assessment of tests. Communication with students takes place in person and in writing via the e-learning system or e-mail.

The teaching staff of the study courses regularly controls the knowledge and skills of the students, using the types of examination indicated in the study course program (see the section Requirements for obtaining credit points in the course descriptions, Annex) - tests, colloquia, reports, homework and independent work, etc. The defence of term papers and course projects and study papers provided for in the study plan is public, with the participation of students and teaching staff.

The procedure for the implementation of the internship at LLU is determined by the Senate decision No. 8-130 (12.11.2014) on the LLU internship regulations and Methodological instructions for internship implementation (http://www.ptf.llu.lv/sites/ptf/files/2020-04/Prakses_nolikums_2020.pdf - *in Latvian*). Training and production internships are assessed with credits. The student acquires the internship program by working in the internship company for the planned time and completing the internship program. During this time, the student prepares a report and submits it to the internship supervisor. The head of the internship organises a public defence of the internship, inviting lecturers of study courses, directors of study programs, etc.

Acquisition of the study program “Food Technology” ends with a developed, reviewed and defended diploma project. Diploma project is an independent student's work, in which the student develops / modernizes / does a technological improvement of a food factory on the basis of acquired theoretical knowledge and practical skills, abilities, consulting with diploma project supervisor on food technology, food equipment, packaging, quality system, economics and business. The regulations for the organisation of the State Examination Commission (SEC), for the pre-defence, evaluation and qualification of the diploma project are regulated by the Regulations on Examinations of Undergraduate Studies approved by the Senate of the Latvia University of Life Sciences and Technologies (Senate decision No. 8-65, 9.04.2014). By the Rector’s order of the Latvia University of Life Sciences and Technologies, the SEC is organised, including specialists from the food industry and state controlling institutions, the director of the study program and the dean. The composition of the SEC, as well as the results of the defence of the diploma project, are discussed at the meeting of the Board of Faculty of Food Technology.

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

Regulations of the Cabinet of Ministers of the Republic of Latvia No. 512 (26.08.2014) “Regulations on the State Standard of the Second Level Professional Higher Education” determine the necessity of internships in the study process. Practical training is an integral and mandatory part of the study process for full-time and part-time students of the second level professional higher education study program. Four production and two training internships are provided for full-time students of the study program “Food Technology”, but two production internships for part-time students. The aim of the internships is to strengthen the knowledge acquired during the theoretical courses in order to better understand the specifics of the company's activities, the course of technological processes in food production and other issues. The Faculty of Food Technology of the Latvia University of Life Sciences and Technologies has developed Methodological Guidelines for the Implementation of Internships (http://www.ptf.llu.lv/sites/ptf/files/2020-04/Prakses_nolikums_2020.pdf - *in Latvian*), which summarises all information on practices, their duration, objectives and tasks.

Training internship The basics of the food industry is implemented in the 1st semester, during which students acquire knowledge about the study procedure at LLU, get acquainted with the distribution of the academic year, students' rights and obligations, with the LLU Fundamental Library working principles, as a result they are enabled better understand and organise their own studies. Students get acquainted with food production companies, industry specialists and faculty graduates, gaining insight into current issues significant for the food industry. The second internship Food Quality Management I is implemented in the 7th semester. Students gain knowledge about quality management systems in various food companies, develop production technologies for specific food products under the guidance of profiling teaching staff, as well as the principles of technological and microbiological control of semi-finished and finished product quality.

Students independently choose an internship place in one of the food production companies or they are offered internship places in production companies with which LLU PTF has concluded cooperation agreements or companies offer internship places by announcing internship competition, as well as students are able to take advantage of the opportunities of the ERASMUS +

mobility programme.

For full-time students, production internships - Introduction to the Food Industry, Food Equipment and Food Technologies - are at the end of each academic year, which allows students to consolidate their theoretical knowledge in practice. In turn, the production practice Food Quality Management II is implemented in the 8th semester, when students acquire knowledge about quality and logistics systems in a particular food company, their importance. Students use the knowledge gained in this practice in the development of a diploma project, where one of the parts is Quality Management.

For part-time students, production internships - Food Equipment and Technology and Food Quality Management - are organized in the 8th and 10th semesters, respectively. During these production internships, students gain specialised knowledge and critical understanding of technological processes, their organization, technological equipment and flow lines in a particular food company or department, as well as knowledge on quality and logistics systems in a particular food company, their importance. Students can use the acquired practical knowledge in the development of study work in food production design and diploma project.

During the training and production internships, students need to perform specific tasks and achieve the results of the internship, which are defined in the Methodological Guidelines for the Implementation of Internships at the Faculty of Food Technology. Each internship program is designed considering the theoretical courses acquired during the specific study period and the acquired knowledge and skills, thus, strengthening them during the internship, improving practical skills and knowledge in the food production company, strengthening the achievable results and competencies in the respective field. After the internship, students prepare the report, which is publicly defended upon return to the faculty. Internships are assessed by a formal test (pass / fail). The internships implemented in the study program are an important aspect for students to prove themselves as an interested future specialist and potential employee, thus providing not only a place of practice but also a place of work during and after studies.

### 2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.

Full-time and part-time students of the study program “Food Technology” develop a diploma project, which is a final thesis. In the development of a diploma project, students must be able to demonstrate the knowledge acquired in the study process - theoretical and practical - by developing a project of a new food production company or reconstruction of the existing company. Within the diploma project students choose and develop production technology for the selected food products, perform the necessary calculations of raw materials, products, auxiliary materials, select appropriate equipment, draw production technological scheme and facility layout, develop activities marketing of the product, analyse competitors, develop the designed company's SWOT matrix and perform its analysis. Students also conduct practical research by preparing a product prototype, or conducting a consumer survey, or in-depth market research - http://www.ptf.llu.lv/sites/ptf/files/2021-02/Diplomprojekta_metodiskie%20noradijumi_2021.pdf - (*in Latvian)*.

Student diploma projects are developed in very different directions - bread, confectionery (flour and sugar), alcoholic beverages, milk processing, meat and its processing, fish, their processing, fruit, vegetable and berry processing. Some of the topics of the diploma projects are focused on the

development of traditional food production or processing technologies. Every year, students also choose more non-traditional raw materials or technological solutions for the production of products that correspond to the current trends in the food market and production, for example:

- production projects in *grain processing* - buckwheat-millet beer, IPA, APA or ale type beer, corn distillate, gluten-free bread and confectionery, frozen cakes, wholemeal pasta;
- factory projects in *milk processing* - fast dissolving milk tablets, products with reduced lactose content or without lactose (milk, yoghurt, ice cream), milk protein with various additives, soy tofu, goat milk products;
- production projects for *meat processing* - production and processing of turkey and lamb meat, vegetable-based meat substitutes;
- production projects for *fruit, berry and vegetable processing* - sea buckthorn processing, lyophilized berry and vegetable products, horseradish processing, dry desserts and porridge, mushroom processing, apple chips, steamed potatoes;
- plant projects for various *beverages* - birch juice concentrates and beverages with jelly beads, tea mushroom beverages, ginger beverages.

Students choose topics relevant to food production, related to the development of new products and technologies that provide consumers with products with a longer shelf life, products for people with special diets, vegetarian and vegan products, etc.

About 10% of all developed diploma projects are reconstruction projects of various food production companies. These diploma projects are related to the introduction of new products into production, which means that both new equipment and premises are needed. So far, students have chosen to modernize the following food companies - Ltd Cannelle Bakery, Dairy Co-operative Straupe, JSC Smiltenes piens, Ltd Jelgavas Gaļsaimnieks, JSC Tukuma piens, JSC Latgales piens, JSC Ķekava, JSC Jaunpils pienotava and Ltd Dagi. Reconstruction projects in various food companies are mainly chosen by part-time students, as these are the companies where they work on a daily basis and are well aware of the problems and provide constructive solutions.

The reviewers of the diploma projects are industry specialists - heads of food production companies, technologists and quality managers. Such involvement of specialists ensures connection of theoretical knowledge with practical knowledge, and shows how relevant are the problems solved in students' diploma projects for the food industry. Every year, 20–25 reviewers - specialists of the field - participate in the review process of diploma projects.

The connection with the food industry is also ensured by the industry specialists involved in the work of the State Examination Commission. Experts from food production companies represent at least 75.0% of the commission members. After defending diploma projects, the State Examination Commission provides recommendations, which are mainly related to solving topics relevant to the field and improving the content of diploma projects, constructively encouraging changes in the implementation of study courses, gathering information and preparing diploma project chapters.

The Table 2.5.1. summarizes the information on the evaluation of diploma projects in different study years. The collected data show that the students of the study program “Food Technology” defend the developed diploma projects with very good success - the average grade is 8.0–8.5. There is a tendency that the number of diploma projects, which is assessed as excellent is increasing – from 2.5% in the academic year 2013/2014 up to 10% in the academic year 2019/2020.

Table 2.5.1.

Diploma project defense assessments for students of the second level study program “Food Technology”, in percent

| Assessment | Academic year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2013/2014 | 2014/2015 | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
| With distinction (10) | - | - | 2.5 | 7.1 | 7.5 | 4.0 | 10.0 |
| Excellent (9) | 33.0 | 48.3 | 20.5 | 35.7 | 45.0 | 20.0 | 27.0 |
| Very good (8) | 37.0 | 37.9 | 54.0 | 25.0 | 32.5 | 48.0 | 40.0 |
| Good (7) | 28.0 | 13.8 | 20.5 | 28.6 | 15.0 | 24.0 | 20.0 |
| Almost good (6) | 2.0 | - | 2.5 | 3.6 | - | 4.0 | - |
| Satisfactory (5) | - | - | - | - | - | - | 3.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Average grade** | **8.0** | **8.4** | **8.0** | **8.1** | **8.5** | **8.0** | **8.0** |

## 2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.

In order to develop and improve the study program “Food Technology”, it is necessary to find out the **students'** opinion about the study process, professionalism of teaching staff and mutual communication, the most complex study courses and the necessary improvements. Students can express their opinion about the study course in a survey, which is conducted centrally in the LLU Information System (LLU IS) after the end of each course, as well as make suggestions and recommendations, providing both constructive and subjective criticism in discussions with teaching staff and the study director.

73% of students evaluate the study climate as positive, favourable and stimulating to study. Since the second semester of the academic year 2019/2020 all study process was implemented remotely, in connection with the epidemiological situation in the country and the world, and 6% of students

admitted that good contact with teachers and classmates had not been established. This situation was new not only for the teaching staff, but also for the students, therefore it forced to reorganize the study process by transferring it to the e-learning environment. The lack of contact with faculty and classmates was mainly acknowledged by the first-year students, when we responded by discussing with students and faculty possibilities to improve the situation. 76% of students admit that in the study process very good or good cooperation is formed with the teaching staff of the study course. Students admit that the teaching staff of the study courses is professional and qualified (60%), also welcoming and supportive (76%). In turn, 23% of students admit that the cooperation is satisfactory, which is more related to the distance learning process, when it is necessary to learn new methods of study course implementation. The majority of students (70%) admit that theoretical and practical training is well thought out, allows to understand the study course. Greater dissatisfaction has emerged in the last six months, as it is not so easy to distinguish between theoretical studies and practical studies in the distance learning process. Students were asked which are the most difficult / complex study courses and why. Students recognize Physics, Organic Chemistry, Engineering Graphics, Theoretical Mechanics, Milk, its Processing as the most difficult study courses, because the study courses are taught complex, inconceivable to students. In order to facilitate the understanding of the study courses and to clarify unclear issues or supplement the missing knowledge, students are welcome to consult with the teaching staff during their office hours (twice a week) in person or using the e-learning platform. Some students admit that study courses seem difficult / complicated because there is not enough basic knowledge in exact subjects, which makes studies difficult. Most often there is a lack of knowledge in Mathematics and Chemistry, therefore, finding out the needs of students, additional courses are organised in these subjects. Although answering the question of what should be changed in the study plan, students admit that the study courses are logically arranged, they complement each other and perceive each study course as necessary for obtaining education. There were no unambiguous answers from students that would need to be improved in the study courses, because some students are confused about the need of some study courses, but some acknowledged that all courses are necessary, only more attention should be paid to the quality of implementation and scope. In such cases, the director of the study program invites the lecturer of the study subject to re-discuss the content of the subject and the teaching methods. Students also admit that LLU is provided with a very good, modern (24%) or appropriate (52%) material and technical base for study work. On the positive side, 57% of students acknowledged that if they had the opportunity to start their studies from the beginning, they would do so again by choosing the second level professional higher education study program “Food Technology”.

The surveyed **graduates** also admitted that the study process is well ensured, the teaching staff is professional and qualified and the opportunities for the use of knowledge acquired during the studies in practice depends on each individual. Graduates point out that it would be necessary to link more the study courses with the real situation in food production companies and the latest technologies. The lecturers of the study courses follow the latest trends on a daily basis, participate in various seminars related to the food and beverage production and related industries in order to transfer the acquired knowledge to the students. In some study courses, we attract industry professionals, who can acquaint students with current events in the food and beverage related fields. Students can acquire practical knowledge about the quality of raw materials, technological processes, equipment, quality systems, and packaging materials during the internship, when close cooperation between the internship manager in the company and the student is required. Based on the recommendations, the tasks to be performed during the internship and the goals to be achieved are reviewed. Students of the internship “Food Quality Management I” are provided with an opportunity to go on excursions to food production companies, thus providing an opportunity to get acquainted with the real situation in the industry.

In various Latvian food companies, depending on its size, one to ten food and beverage technologists, LLU PTF graduates are employed. The surveyed **employers** admitted that food and beverage technologists have been provided with sufficient basic knowledge during their studies to be able to work in the food industry and use the theoretical knowledge acquired during the studies in practice. However, employers acknowledge that the study process should pay more attention to the latest trends in food production and related industries and promote teamwork. In the implementation of study courses, students have to do individual work, but they also have to work in groups, for example, in laboratory work and presenting results. This can help develop communication skills required in production setting. Employers also note that many things are changing, but there are basic things in food production that are constant, and the food and beverage technologist needs to know them, which is ensured during the studies. Most of the surveyed employers admit that they are happy to have students – the future food and beverage technologists – for their internship into practice. It gives the opportunity for the students to familiarise themselves with food production process, but for employer – to learn about potential employees.

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

Students of the study program “Food Technology” may use the opportunities of the Erasmus + program. The Erasmus + program at LLU is coordinated by the International Cooperation Centre.

***Outgoing students mobility***

At any stage of their studies students of the study program have the opportunity to participate in the study mobility to 12 countries, with which LLU has concluded bilateral cooperation agreements. As shown in Table 2.7.1. during the period 2013-2020, 21 students completed their exchange studies at different universities. Students have mainly hosted by the universities in three countries: Abant Izzet Baysal University (Turkey), University of Ljubljana (Slovenia) and Agricultural University of Athens (Greece). Students prefer to go on study mobility in the sixth semester of studies, when similar study courses are taken at the selected universities. Before going on study mobility, study courses are coordinated, which will be acquired in exchange studies, so that it would be possible to recognise them replacing those acquired in the program in the specific semester. If students have met all the requirements, the previously agreed courses are counted towards degree. The recognition of the courses takes place in accordance with the LLU Rector's order No. 4.3.-8/78 (02.11.2016) On the procedure of academic recognition at LLU, when the Director of Studies prepares the Protocol of Academic Recognition. Experience so far shows that it is possible to recognise 100% of the acquired courses. As there are study courses that cannot be acquired and equated, students are given one semester upon return (while maintaining state funding) to complete the missing study courses.

As shown in Table 2.7.2. for the period 2013-2020, 23 students of the study program “Food Technology” have used ERASMUS + mobility internship option. Students have chosen to go on internships to various food companies in 12 countries. This type of mobility has mainly been used by students in the 3rd and 4th academic year, when the program has production internships, which are recognised upon return and submission and defense of the internship report.

***Incoming students mobility***

The study program “Food Technology” is implemented in Latvian, no foreign students have studied full-time or part-time in the program. It should be noted that ERASMUS + students of foreign universities often choose specialization courses in the program. As shown in the Table 2.7.3., then for the period 2013-2020, 19 students from 8 different countries (Czech Republic, Spain, Germany, Kazakhstan, Ukraine, Greece, the Netherlands and Italy) came to ERASMUS + mobility.

Table 2.7.1.

Students outgoing mobility for studies

| Study year | Number of students | Country | University |
|---|---|---|---|
| 2013/2014 | 2 | Turkey | Abant Izzet Baysal University |
| 2014/2015 | 2 | Slovenia | University of Ljubljana |
| 2015/2016 | 2 | Slovenia | University of Ljubljana |
| 2016/2017 | 3 | Slovenia | University of Ljubljana |
| | 2 | Greece | Agricultural University of Athens |
| 2017/2018 | 1 | Greece | Agricultural University of Athens |
| | 2 | Slovenia | University of Ljubljana |
| 2018/2019 | 3 | Greece | Agricultural University of Athens |
| | 1 | Turkey | Abant Izzet Baysal University |
| | 1 | Slovenia | University of Ljubljana |
| 2019/2020 | 2 | Greece | Agricultural University of Athens |
| **TOTAL** | | **21** | |

Table 2.7.2.

Students outgoing mobility for traineeships

| Study year | Number of students | Country | Company |
|---|---|---|---|
| 2013/2014 | 1 | Germany | Backerei |
| 2014/2015 | 2 | Lithuania | Lietuvas Kepejas |
| | 1 | Estonia | AS NOO Lihatoostus |
| 2015/2016 | 2 | Italy | Latte Arborea, i.e. Cooperativa 3A |
| | 1 | Finland | Alands Mejeriet |
| | 1 | Germany | Kunstmuhle Reisgang Josef |
| 2016/2017 | 1 | Italy | Arborea Cooperativa |
| | 2 | Portugal | Polytechnic Institute of Braganca |
| | 1 | Finland | Alands Centralandelskag ACA |
| | 1 | Germany | Kunstmuhle Reisgang Josef |
| | 1 | France | National Polytechnic Institute of Toulouse |
| 2017/2018 | 2 | Germany | Kunstmuhle Reisgang Josef<br>Bäckerei Wandinger |
| | 2 | Netherland | Sofra Dairy |
| 2018/2019 | 2 | Estonia | Lehe Pruulikodacraft bewery |
| 2019/2020 | 2 | Norway | Karslosybruket AS |

| | | | |
|---|---|---|---|
| | 1 | Slovenia | Mlekarne d.o.o |
| **TOTAL** | | **23** | |

Table 2.7.3.

Distribution of ERASMUS + students who have completed courses in the study program Food Technology (incoming mobility)

| Study year | 2013/2014 | 2014/2015 | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
|---|---|---|---|---|---|---|---|
| Number of students | 3 | - | 4 | 6 | 1 | 2 | 3 |

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

The support of administrative and technical staff is sufficient to ensure the achievement of learning outcomes. The implementation of the study program is ensured by the director of the study program, the methodological commission of the faculty and the dean. The methodological, informative and material-technical provision of the study program (incl. premises, equipment, study environment, financing for students' self-government) is sufficient and is able to ensure an efficient study process.

Students have the opportunity to study independently and communicate with the academic staff electronically, using the e-environment and e-learning tools. Study materials are added in the e-study system (Moodle environment) created by LLU, which is available on the data website: https://estudijas.llu.lv/?lang=en.

International students and visiting professors have the opportunity to use university hotels and other services, incl. computers, libraries, etc.

To prepare the independent work, the LLU library with a wide range of special literature and access to various databases is available at https://llufb.llu.lv/en, wireless internet in the premises of the main administrative building of the Latvia University of Life Sciences and Technologies (castle), materials collected by the teaching staff and scientific literature, which are in the private collections

of faculties / departments / institutes or lecturers. The Electronic Catalogue of the Fundamental Library of the Latvia University of Life Sciences and Technologies contains information on more than 3,500 publications in the field of food science.

There are various options for searching for information:

- **Databases:**
  - AGRIS database;
  - Databases created by LLU Fundamental Library staff: “Electronic catalogue of LLU Fundamental Library”, “Publications of LLU lecturers and researchers”, “Doctoral theses defended at LLU”, “Master's theses of LLU” and “Articles of LLU journals and conferences”,
  - Electronic catalogues of LLU information centres and information offices;
  - Subscribed databases, E-journals, E-books: CAB Abstracts, CABI Animal Health and Production Compendium, CABI Crop protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO database, EBSCO eBook Academic Collection, Newspaper library, Letonika, ScienceDirect journals, Scopus, Escival, Web of Science, Wiley Online.
- **Library collections** *(agriculture - 38%, natural sciences - 10%, social sciences - 24%, technology - 19%, other fields of science - 9%)***;**
- **Internet resources** *(encyclopedia, dictionaries, etc.)***;**
- **Information seekers and portals** *(CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer LINK, etc.)***;**

From June 1, 2012, the LLU Fundamental Library provides access to subscribed databases outside the LLU network with the EZproxy tool, using the LLU IS or e-study system user account.

During the academic year 2015/2016 , the Study and Science Centre of the Faculty of Food Technology of the Latvia University of Life Sciences and Technologies was put into operation in Valdeka (Rīgas Street 22, Jelgava). In the academic year 2015/2016, thanks to two ERDF projects, the study and research infrastructure of PTF was modernized by purchasing high-pressure processing and other equipment:

1) No. 2010/0119 / 3DP / 3.1.2.1.1. / 09 / IPIA / VIAA / 009 “Modernization of LLU study infrastructure”;

2) No. 2011/0040 / 2DP / 2.1.1.3.1 / 11 / IPIA / VIAA / 002 “Research Centre for the Utilization of Agricultural Resources and Food of National Importance” (2012-2015).

The sources of funding for the study program “Food Technology” are:

- State budget funds intended for the implementation of the study program by financing a certain number of study places;
- funds paid for studies by individuals;
- funds from the development of scientific contract works (part of these funds is allocated for the renewal of materials and technical base, purchase of equipment and apparatus, purchase of chemicals and other auxiliary materials for specific analyses, purchase of laboratory utensils, computer equipment, presentation equipment: multimedia, etc.);
- funding for the maintenance of scientific infrastructure;
- ERDF financing for repair of laboratory premises, materials for improvement of technical base.

An important condition for the implementation of the study process is the capacity of the laboratory premises and their provision. The study process takes place in different faculties of the Latvia

University of Life Sciences and Technologies - Food Technology, Technical, Economic and Social Development, Forestry, Environment and Construction, Information Technology, which ensures the implementation of various study courses. All LLU buildings have an Internet connection, equipment available for demonstrating lectures - multimedia projectors, computers, etc. The following laboratories are at the disposal of the Faculty of Food Technology for student training and development of diploma projects:

- processing plants / pilot plants for products of animal origin (milk, meat and fish) with the necessary equipment for the production and quality assessment of products;
- processing plants / pilot plants for products of vegetable origin (berries, vegetables, fruits, cereals), where there are the necessary equipment for the production and quality assessment of products;
- sensory evaluation laboratory (10 individual workplaces equipped with FIZZ portable (BIOSYSTEMES, France) system, which is an interactive system for performing sensory tests and collecting and interpreting the obtained data);
- microbiology laboratory (individual workplaces equipped with microscopes, microorganism colony counter, incubators, etc.);
- food quality assessment laboratory (equipment for determination of freezing temperature, distillation equipment, viscograph for determination of flour viscosity, farinograph, distillation equipment for determination of alcohol strength, volatile acids);
- nutrition laboratory (flow injection equipment for the determination of nitrites, nitrates in dairy, meat products), hydrolysis equipment and filtration equipment for the determination of fibre, fluorometer, extraction equipment set Soxtec 2045, distillation equipment set Kjeltec 2100, mineralization equipment with collector);
- a packaging laboratory equipped with the equipment for packaging of various types of products (juice filler, vertical packaging equipment with a dispenser, vacuum and modified atmosphere packaging, back-pressure autoclave, etc.);
- process and equipment laboratory, which has the necessary equipment for the provision of study work - high-pressure processing equipment, freeze-dryer, plate freezer, microwave-vacuum dryer, laboratory spray dryer, rising film evaporator, plate heat exchanger for pasteurisation and UHT process etc .;
- a scientific laboratory with equipment for the analysis of the chemical composition, texture, rheological and other parameters of new products.

Every year, the Senate of the Latvia University of Life Sciences and Technologies approves the distribution of revenues and expenditures of the LLU general budget structure, prepared in accordance with the Saeima annual law “On the State Budget” and the annual LLU Rector's order “On the LLU general budget planning”. The control and audit of the general budget is performed by an independent sworn auditor, whose opinion and report are reviewed and approved by the Senate.

Before the distribution of LLU general budget, revenue and expenditure is approved by the Senate, it is reviewed, discussed and approved by the Working Group on Resource Use and Development, which consists of Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Centre / Chief Accountant, head of the Financial Planning Centre, key economists, key specialists in real estate and legal issues.

The distribution of income and expenses approved by the Senate of the Latvia University of Life Sciences and Technologies determines that 80% of the funding allocated from the state consists of remuneration costs and 20% other costs. 60% of the paid study funding consists of remuneration costs and 40% other costs, of which 20% are directly at the disposal of the faculty that implements the respective study program. The amount of funding for the research base is calculated and allocated annually from active research activities. 50% funding for the research base is at the direct

disposal of the faculty and 50% to cover centralized costs. Competitive research funding consists of funding attracted for the implementation of the specific projects.

The distribution of the total budget of LLU is formed by the estimates of structural units / faculties, where costs are estimated by the type of expenditure.

In 2020, the share of costs for the study program “Food Technology” consists of:

- Remuneration - 74%
- Scholarships - 7%
- Goods and services - 18% incl. utilities - 6%
- Share for the fixed capital formation - 1%

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MFA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite agreement on funding for 2020 stipulates that the basic cost of one study place is 1518.98 EUR, the study level coefficient for bachelor's programs is 1 and the social security of the study place for bachelor's programs is 164.34 EUR, the study cost coefficient for the 2nd level professional higher education for the program “Food Technology” is 1.8, the cost per student “Food Technology” is 2898.02 EUR (Table 3.1.1).

In accordance with LR Cabinet Regulation No. 994 “Procedures by which higher education institutions and colleges are financed from the state budget” (12.12.2006), the study cost coefficient for the thematic field of education for the 2nd level professional higher education study program “Food Technology” is 1.8.

In the academic year 2019/2020, tuition fee for full-time students was 1900.00 EUR, for part-time students - 1300.00 EUR.

In the Table 3.1.1. information on changes in the basic funding costs of one study place is summarized.

Table 3.1.1.

Changes in the cost of basic funding for one study place, 2013 - 2020

| Year | Basic costs of one study place, EUR | Costs per student, EUR |
|---|---|---|
| 2013 | 1333.36 | 2181.56 |
| 2014 | 1333.11 | 2173.51 |
| 2015 | 1333.11 | 2191.06 |
| 2016 | 1333.11 | 2190.93 |
| 2017 | 1393.33 | 2672.14 |
| 2018 | 1458.51 | 2788.55 |
| 2019 | 1518.98 | 2897.83 |
| 2020 | 1518.98 | 2898.02 |

**3.2. Assessment of the study provision and scientific support, including the resources provided within the cooperation with other science institutes and institutions of higher**

**education (applicable to the doctoral study programmes).**

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

In the implementation of full-time and part-time study courses of the study program “Food Technology” 51–53 teaching staff members participate (Table 4.1.1).

Table 4.1.1.

Distribution of academic staff members involved in the implementation of the second level professional study program Food Technology

| Position | Study year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2013/2014 | 2014/2015 | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
| Professor | 10 | 10 | 10 | 8 | 10 | 8 | 11 |
| Associate professor | 9 | 10 | 12 | 10 | 12 | 10 | 9 |
| Assistant professor | 18 | 17 | 15 | 18 | 15 | 17 | 15 |
| Lecturer | 15 | 13 | 13 | 16 | 13 | 17 | 17 |
| Assistant | - | - | - | 1 | - | - | 1 |
| Researcher | - | 1 | 1 | - | 1 | - | - |
| **TOTAL** | **52** | **51** | **51** | **53** | **51** | **52** | **53** |

The share of professors and associate professors has been from 34.0% (2016/2017) to 45.1% (2015/2016). Assistant professors from 28.3% (2019/2020) to 34.6% (2013/2014) participate in the implementation of study courses each academic year. These lecturers mainly supervise lectures and laboratory work, but lecturers, assistants and researchers - manage laboratory and practical work. Lecturers, assistants and researchers participate in the implementation of study courses every study year, which is 1.9% of the total number of teaching staff, while in the implementation

of study courses 28.3–34.6% of docents. The quality of study courses cannot be unambiguously assessed by the position to be held, because not all can be professors and associate professors, which is related to the limited number of these positions in the respective fields of LLU. It has more to do with the charisma of the teacher and the ability to pass on their knowledge to the students. It should be noted that assistant professors (docents), lecturers, assistants or researchers participate in the implementation of general education study courses (for example, Professional English and German, Philosophy, Ethics, Aesthetics, Ecology and Environmental Protection) and theoretical courses in the field (for example, Engineering Graphics, Mathematics). Approximately 80% of the teaching staff participating in the professional specialization courses in the field (e.g. Food Processes and Equipment, Food Packaging, Milk, Milk Processing, Grains, Grain Processing, Microbiology) are professors and associate professors who are professionals in their field.

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

The qualification of the teaching staff involved in the second level professional higher education study program "Food Technology" is in accordance with the Law on Higher Education Institutions of the Republic of Latvia and the Regulations of the Latvia University of Life Sciences and Technologies on academic positions. The regulatory enactments stipulate that the scientific and pedagogical qualification of professors and associate professors is evaluated every six years by the Council of Professors, while the scientific and pedagogical qualification of assistant professors, lecturers, assistants and researchers is evaluated by the Council of the faculty or institute. Thus, it shows that all teaching staff involved in the implementation of study courses have appropriate qualifications and are able to ensure a quality study process. The LLU has established an Academic Staff Motivation System (Study Council Decision No. 2.4-13 / 8 (29.11.2017)), which evaluates the professional development of each lecturer once a year. Once in six years, the teaching staff involved in the implementation of the study process needs to acquire the professional development program “Innovations in University Didactics” for university teachers (160.0 h). The professional development program is designed to cover the latest trends in study courses and presentation tools, psychology, the work with large and small groups of students or foreign students, update on the e-studies system. Thus, any lecturer involved in the in-service training program can acquire some knowledge that can be used in their study course,

Every year the teaching staff can improve their qualification by participating in the Academic Conference organized by LLU, where topical issues of the study process are discussed - LLU on the way to assessment and accreditation (2020), Study quality: experience development opportunities (2019), Towards the study direction / program accreditation (2018), Internationalization at the Latvia University of Life Sciences and Technologies (2017) and others.

During the last six years, significant attention has been paid to the improvement of the English language of the teachers involved in the study process. The improvement of the English language

of the teaching staff of the Latvia University of Life Sciences and Technologies was carried out within the framework of the project No.8.2.2.0 / 18 / A / 014 “Improvement of the academic staff of the Latvia University of Life Sciences and Technologies”, the total amount of hours of English language training was 152 h. This is an important contribution to the training of teachers, which helps to achieve the learning outcomes of the courses, as the latest information about the field and related knowledge is available in English. The teaching staff of the study program "Food Technology" uses the opportunities to improve their qualification using ERASMUS + opportunities to give lectures at foreign universities, or to gain experience where the acquired knowledge can be used in the implementation of study courses.

More and more different technologies and opportunities for their use in the study process enter the daily lives of both teachers and students. This became particularly important and relevant in the spring of 2020, when the Covid-19 pandemic took over the world. Teachers of the study program "Food Technology" have supplemented their knowledge in courses provided by ZRKAC (Zemgale Region Competence Development Centre) MS Cloud Services for Data Storage and Sharing, Dynamic and Active Presentation (PowerPoint direct options and additional plug-ins) and Online tools for creating and presenting interactive presentations to create online surveys. Teachers use the knowledge gained in the courses for better, more interesting and interactive communication (lectures, practical work, tests or surveys) in study courses with students.

As this study program is a professional study program, it is important not to lose touch with production. ESF project no. 8.2.2.0/18/A/014 “Improvement of LLU academic staff” teaching staff is provided with internship opportunities in various companies (Ltd Kurzemes Biznesa inkubators, JSC Tukuma piens, Ltd Lāči, etc.), improving and updating professional knowledge for use in various study courses. Every year, in order to supplement their knowledge and use it in the implementation of study courses, teachers participate in general education courses (some examples - Innovations in the bioeconomy sector in higher education, Bioeconomy sector contribution to Latvian economy, Competence-based mathematics education, Ice cream and milk processing, Public speaking and speeches, etc.) (Latvian Language); Preferences expectations understanding contexts emotions consumers individual differences product characterization, Adults' problem-solving skills enhancement strategies enabling to improve personal resilience, Engineer the future: from idea to final product, Technical and application demonstration of HERACLES electronic nose, Network sensory software: Master the essential concepts of FIZZ sessions, Hands-on Training on Baking Technology (in English). Every year, the teaching staff participates in the quality assessment of products (bread, honey, milk, beer, packaging) organized in Latvia and abroad. In such assessments, it is possible to obtain the latest information on the quality of products on the market, assessment methods and current events in the industry, which is essential for the quality of the study process.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

The teaching staff involved in the implementation of the study program "Food Technology" annually participates in various projects. The teaching staff are the managers and executors of international level projects (projects or sub-projects):

1. BONUS project MIRACLE
2. INTRREG projects - Ready for Business (ReforB), Regional policy-making for businesses in rural areas for the development of innovative competitiveness and growth (INNOGROW);
3. Seventh Framework Project EUROLEGUME;
4. Norwegian grant projects - Innovative approach to hull-less spring cereals and tritical use from a human health perspective and The edible coating formulated with liquid acid whey protein and bioactive compounds, and biodegradable packaging for safety of probiotic cheese
5. COST action projects;
6. TEMPUS project Modernization of higher education in the area of food quality and safety in Tajikistan;
7. COMENIUS sub-program activity “Comenius Reggio partnership” project New Approaches to Foreign Languages Teaching in Turkey and Latvia - ICT in Language Classes;
8. International Erasmus + project entitled “Smart School in restoration and construction industry”.

The teaching staff of the study program has participated in the management and implementation of the State research program AgroBioRes, EKOSOC-LV reCOVery-LV, where research related to soil quality assessment, raw material and product quality and economic calculations has been performed.

By participating in the implementation of EAFRD projects of the Ministry of Agriculture of the Republic of Latvia, the teaching staff in cooperation with producers implement research that provides opportunities to get acquainted with the latest trends in food and related industries. Some examples of the projects, the implementation of which provides knowledge that can be used in study courses:

1. Establishment of an electronic farm management system.
2. New solutions for the production of dairy products and their by-products.
3. Economically justified processing of whey into new products for food and feed
4. Increasing the added value of food produced from Latvian agricultural products and

promoting the competitiveness of food products.

5. Development of a mixture of honey with high nutritional value and constant viscosity.
6. Industrial research - production and processing of organic and conventional cabbage.
7. Development and production of innovative components for confectionery (cakes) from potatoes.
8. Development of smart packaging for liquid egg products.
9. Industrial research to determine the optimal packaging and appropriate shelf life for fresh spirulina.

The teaching staff of the study program is involved in two European Maritime and Fisheries Fund (EMFF) projects. Development of new more economically advantageous fast-cooking whole muscle products with high nutritional value and production of structured fish mass (minced meat) from Baltic fish and its use in fish products. Involvement in these projects provided teachers with knowledge that can be used to develop new products, improve technological processes, quality assessment methods and economic calculations in the preparation of such products.

The teaching staff participates in the development of the National Armed Forces of the Republic of Latvia “Dry Ration Pack”, which was created by order of the Ministry of Defense of the Republic of Latvia, and the acquired knowledge can be used in studies on new product and technology development, latest trends in packaging, extending product shelf life product.

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

The mutual cooperation of the teaching staff of the study program “Food Technology” can be assessed as satisfactory. When working on the interconnection of different study courses, it is meant that the knowledge, skills and competencies acquired in the study courses should be used in the next ones, but it does not always work. Therefore, in the future it is necessary to involve more teaching staff of general education and field theoretical study courses in the activities of the joint program implementation. In its turn, very good cooperation has been established between the teaching staff of the professional field specialization study courses. Positive cooperation is confirmed by the fact that students need the previously acquired courses (Food Processes and Equipment, Building Basics, Engineering Graphics, Food and Beverage Packaging, Entrepreneurship in the Food Industry, Milk, Meat, Grains, Fish, Fruits and Vegetables, their Processing, etc.) in the development and defence of a study paper and diploma project. Teachers of various study courses are involved in the development and defence of the study paper, here it is possible to see the strengths and weaknesses of the cooperation. By discussing the weak points in the cooperation, solutions are found to eliminate them.

At the time of submitting the self-assessment report, the ratio of students and lecturers of the study program Food Technology is 18.1.

# Annexes

| | | |
|---|---|---|
| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | 5_annex_student statistics_PPT_ENG.docx | 5_Pielikums_studejoso statistika.docx |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | 6_annex_standard_PPT_ENG.docx | 6_Pielikums_atbilstiba standartam.docx |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | 7_annex_professional standard_PPT_ENG.docx | 7_pielikums_atbilstiba profesiju standartam.docx |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | 8 annex_mapping_full_part time_PPT _ENG.xlsx | 8 pielikums_PPT kartejums_pilns_nepilns laiks_LV.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | 9_annex_study course plan_PPT_full_part time_ENG.docx | 9_Pielikums_studiju kursu plans_PPT_pilns_nepilns_LV.docx |
| Descriptions of the study courses/ modules | programmas_ENG_full time.zip | programmas_LV_pilns laiks.zip |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | 2_professional higher education_diploma_annex_Food and Beverage Technologist.pdf | 2_lim_prof_Partikas un dzerienu tehnologs_dipl_pielikums_LV.pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | | |
| Sample (or samples) of the study agreement | 18_Study_Agreement_LV_EN_2020.pdf | 18_Studiju_ligums.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | | |

# Design and Crafts (42548)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Design and Crafts* |
| Education classification code | *42548* |
| Type of the study programme | *Professional bachelor study programme* |
| Name of the study programme director | *Zane* |
| Surname of the study programme director | *Beitere-Šeļegovska* |
| E-mail of the study programme director | *zane.beitere@llu.lv* |
| Title of the study programme director | *Mg.paed.* |
| Phone of the study programme director | *+37128321360* |
| Goal of the study programme | *to provide preparation of qualified product designer specialists for work in various types of companies so that they are able to certify and improve their competence for the design and development of individual products and their collections; creative activity with the use of selected materials and technologies; organizing, evaluating and / or managing work in a company, or creating a small / medium enterprise and further studies for a master's degree* |
| Tasks of the study programme | *• to ensure the content of the study program necessary for achieving the goal of the study program, academic staff, literature and methodological materials, material and technical base, opportunities for scientific work and a favorable study environment;*<br>*• to provide opportunities for the use of theoretical knowledge in practice, promoting the improvement of students' skills in product development technologies, design, organization of company work;*<br>*• to develop research skills in product development technologies and design;*<br>*• to develop competence for participation in the maintenance and development of Latvia's intellectual potential and culture, especially in local communities;*<br>*• to promote the formation of a creative, responsible and motivated personality for lifelong learning;*<br>*• to provide opportunities to prepare students for further education in master's study programs.* |

| | |
|---|---|
| Results of the study programme | *Knowledge: graduate is able to demonstrate comprehensive and specialized knowledge and understanding about design and development of product and it collections, usage of materials and technologies, product design and market tendencies, technical and labor safety terms, organizing and management of small and medium enterprise, building up cooperation and implementation, own and other person's professional development.*<br>*Skills: graduate is able to analyze, synthesize and evaluate critically gained knowledge in professional, IT, social, natural and humanitarian field suitable for designer profession; by grounding on gained knowledge is able to realize professional and research work in creative/innovative way about product design, technologies, material and market development tendencies, to use progressive designing technologies, to manage product development; is able to work successfully alone and in team, to collaborate with professionals in field and society/clients; is able to evaluate necessity for both own and other specialists' professional perfection*<br>*Competence: graduate has competence to think creative and unaided, to perform research to develop product ideas as well as to realize/improve implementation of product in market; to design and develop single products or its 'collections or manage this work considering to design principles, work safety and ecology demands, industry benchmark s, technical terms, legislation and other documents related to industry as well as market/design development tendencies; to make decisions unaided and responsibly and to find creative solutions in variable and unclear conditions by evaluation and prognosis of industry development; to organize, evaluate and/or manage work in enterprise, to administrate agreements and documentation of enterprise or form and manage own small/medium enterprise; to advise about trends of product design, technologies, materials and market development.* |
| Final examination upon the completion of the study programme | *Diploma Project* |

# Study programme forms

**Full time studies - 4 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *4* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Professional Bachelor Degree in Product Technologies and Design* |
| Qualification to be obtained (in english) | *Product Designer* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Part time extramural studies - 5 years - latvian**

| | |
|---|---|
| Study type and form | *Part time extramural studies* |
| Duration in full years | *5* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Professional Bachelor Degree in Product Technologies and Design* |
| Qualification to be obtained (in english) | *Product Designer* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

**1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction**

The parameters of the Study Programme have not changed since licensing.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

The Programme is offered only in Latvian, and totally 91 students study there (82 full-time students including two students for a fee, and nine part-time students) on the 1st of October, 2020. In the first year of the implementation of the Programme (2016/2017) there were only full-time studies for a fee and eight students were enrolled. One student was dismissed for non-compliance of the study contract (failing to fulfil the financial obligations). One more student interrupted studies in the second course due to health problems. The other six students graduated in 2019/2020 study year (the first graduation).

The Programme has been awarded 16 State-funded study places since 2017/2018 and the number of the State-funded study places increased every year (40 places in 2018, 60 in 2019 and 75 in 2020) and they are taken every year. A slight drop-off (mostly dismissed for non-compliance of the study contract (not for non-complying the requirements of the Study Programme) or not starting the studies at all at their own wish is depicted in Fig. 2 of the Annex titled *Statistics on students during the reference period*. The biggest drop-off of the reference period was in 2019/20 study year which, considering statements of several students that they left studies because of inability to organise distance studies by themselves, is connected to Covid-19 Pandemic beginning in the world in the first half of 2020.

The first five part-time students were enrolled in 2017/2018 study year, and one was dismissed for non-compliance of the study contract (failing to fulfil the requirements of the Study Programme). Part-time students were not enrolled next two study-years because the number of applicants did not exceed four (minimum group for part-time studies consisting of five students is determined every year by the Rector’s order on the limit of admission and predictio for the following study year). A new part-time group consisting of five students was enrolled in 2020/2021 study year.

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the**

**admission requirements.**

The parameters of the Study programme are closely interlinked and they complement each other successively.

The title of the Study Programme *Design and Crafts* points to recently increasing tendency in the world to bind together design and crafts, and local community (becoming more topical during the Pandemic conditions) as well as design specificity in general: to know various technologies and use them, be able to interact with individual clients to produce individually ordered items and thus begin own business. In the report of the European Commission (EC) and Report and Recommendations of the European Design Leadership Board (2012, pp. 50. Available: https://op.europa.eu/en/publication-detail/-/publication/a207fc64-d4ef-4923-a8d1-4878d4d04520) "Modern Craft" design level developmental perspectives are stressed ".. a logical step forward that connects the advantages of mass production with those of traditional craft. .. Modern Craft could form an integral part of the innovation system of Europe. Tapping the potential of Modern Craft through design will require a shift in perception".

Since the 90-ies of the 20th century LLU has developped the Study Programmes of Home Economics and Technologies and later also Visual Art and Information Technologies. The emphasis in the Programmes has been put put also on wood, metal and textile craft as well as the development and usage of technologies including also digital opportunities. Wood and metal processing have been in existence at LLU for a long time, and textile since the 90-ies. Thus the development of Design and Cracts Programme has been provided both with equipment and academically.

In the Report of The European Design Leadership Board is said that ".. design is recognised as an important driver of user-centered innovation, drawing upon the innovative and creative talents of Europe's small bussinesses and entrepreneurs that lie at the heart of Europe's strategy for growth" (Design for Growth and Prosperity, 2012, pp. 20. Available: https://op.europa.eu/en/publication-detail/-/publication/a207fc64-d4ef-4923-a8d1-4878d4d04520).

Many students have started their entrepreneurship during studies both by their own forces and by business incubators. Similarly, the role of design knowledge is well obvious during pre-service practices when companies engage students in the development of their businesses or products.

The European Design Leadership Board also emphasizes that "There is a need for a broader approach to design that can bring added value to the public sector, drivind innovative and economically sustainable solutions" (Design for Growth and Prosperity, 2012, pp. 24. Available: https://op.europa.eu/en/publication-detail/-/publication/a207fc64-d4ef-4923-a8d1-4878d4d04520).

Works developed by students relate both to public sector and individual and special groups of humans, thinking about the sustainability of products by choosing natural-friendly and recyclable materials.

Consequently, the degree to be awarded is logical - the professional Bachelor's degree of product technologies and design and the qualification to be obtained is a product designer.

Sequentally, the overall aim of the Programme is to ensure that product design specialists are trained for work in different types and sizes of companies (looking for the practice companies for students, the emphasis is put on the versatility of enterprises because when starting their work independently it could be easier to choose the most appropriate way of product design), and the students can develop not only their creative abilities in new design solutions, but also knowledge of

materials and skills using appropriate technologies up to product marketing. The detailed objectives of the Programme show achieving of the aim, but the results of the studies demonstrate the relevant knowledge, skills and competencies that should be achieved completing the Programme to be fully operational in the chosen field.

According to the rules of admission, designer education is not denied to any interested person who has acquired general secondary or vocational secondary education. Special tests are not required in the process of admission. Students demonstrate that equally good results can be achieved both by the students from general secondary schools and by those who have already obtained professional design or related education on the level of secondary education. Motivation is a decisive factor to study design specialty.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The content of the Study Programme – the specific study courses and their content have been developed basing on the knowledge, skills and competencies defined in the Standard of the Designer's Profession as well as the defined responsibilities and tasks (the code of the profession 2163 04, available: https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0360.pdf - *in Latvian*).

The teaching staff of the study courses is promoted to revise them once a year and update the content, taking into account the latest trends in the sector/field, which are identified by following the newest trends in the field and labour market, visiting exhibitions, passing training and courses (the teaching staff attends and investigates trends in the field's exhibition *Design Isle*, and as far as possible attends other international design exhibitions outside Latvia (information can be found on the CV of each teaching staff member), participating in conferences (there is a section related to design and crafts since 2018 in the international scientific conference "Rural Environment. Education. Personality" (REEP) organised by the Institute of Education and Home Economics (IMI)), discussions (Investment and Development Agency of Latvia (LIAA), activities organised by Zemgale Planning Region) and in work groups after organised investigations (2019/2020 year in the frame of ERAF Project No.8.2.3.0/18/A/009 there had been organised field/sectoral study) and the field's, and work results of other higher education institution experts (in 2020 The Programme had been experted and assessed by the field expert from Latvia and the director of a similar Programme from Estonia). The Conference has been organised for students every year since 2018, in which different entrepreneurs and designers share their experience. Teaching staff also attends the Conference getting information on the recent trends, necessary skills and knowledge on the labour market.

Whereas optional courses (6 CP = 9 ECTS) are a part of the Study Programme, at the initiative of the teaching staff themselves or students' demand, the themes of topical trends should be included in the optional courses. The optional courses are expanded in detail in the Programme because of the different offer every year, however, the second Foreign Language Course (belonging to the optional ones) is compulsory because it is derived from the demands of the Designer's Standard of Profession.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The Content of the Study Programme (study courses) is applied to the Designer's Standard of Profession and the Regulations of the Cabinet of Ministers of the Republic of Latvia No 512 26/08/2014 on the National Standard of the Second Level Professional Higher Education (Available: https://likumi.lv/ta/id/268761-noteikumi-par-otra-limena-profesionalas-augstakas-izglitibas-valsts-standartu - *in Latvian*), as well as considering succession, the aim and outcomes of the Study Programme.

Full-time students during the second semester of the first study year, but part-time students just after signing the study contract choose their further study specialisation (craft textile technologies and design or wood/metal technologies and design).

During the first year of the Study Programme students, like in other programmes, obtain general courses more and step by step are directed towards specialisation courses.

According to the aim of the Study Programme students obtain both product projecting (basic knowledge for all of them, but the students of wood/metal speciality continue on deeper level) and designing/working out of products learning all connected processing and finishing technologies of materials. Product designing on different levels go on during various study courses all study years. The students in parallel obtain knowledge how to work with customers, entrepreneurship, management and organisation of work. The students demonstrate their readiness in the exhibition of diploma projects where, according to the problem put forward through various design thinking processes, they come to the creation of a prototype.

Promotion of the comprehension of design, concepts of design, thinking models and methods, as well as research themes permeate and are included on various levels in many study courses as *Product Design*, *Spatial Experimental and Creative Thinking, Basics of Crafts, Data Obtaining and Processing, Interactive Methods and Professional Communication, Fundamentals of Design and Product Registration, Design Strategies.*

Creating works in practical courses in the frame of assignments or prototypes, students are promoted to use the ideas initiated in composition, drawing, form development and other courses (for instance, drawing and knitting technology courses are in parallel, and one of the assignments is making a wallchart with a fashion illustration which in turn is drawn within the drawing course, etc.).

The connection of study courses with the Programme outcomes (results) is visually seen in the mapping grid (Annex No 8).

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

A variety of methods are used in the implementation of studies, which are a responsibility of each teaching staff member and depend on the specific course. Traditionally studies are implemented by means of lectures and practical works/seminars or laboratory works.

In parallel e-learning environment has been developed at LLU (https://estudijas.llu.lv/?lang=en). Teaching staff members can insert their teaching aids/materials in every study course as well as use video-lectures, assignments, tests, forums, etc. running and delivering their courses, so organising also independent learning of students.

Due to the pandemic Covid-19 in the world as well as in Latvia, spring semester 2020 had been organised in the form of distance learning reinforcing the usage of e-learning environment: lectures in PowerPoint with a voice record, recorded videolectures, online lectures on BBB platform, consultations of practical works in the form of videocall using Whatsapp, Zoom and other platforms.

When discussing that period with students, it is clear that this has required a lot of effort and control of own learning, that is why it is consequently that some students have not been able to carry out such a learning process and have abandoned their studies.

According to the skills and competences for the designer profession, students work a lot practically. A variety of creative and problem-centred assignments as well as individual, peer and mixed-group works are offered to promote a team work of future designers. There are courses in which designer-client roles are played. Creative and design thinking methods are being applied, thereby promoting the students' creativity and understanding of interlinked process of work.

Whereas students have different levels of previous training (others come from the secondary school, others already have secondary professional education and others have the art school's experience), lecturers can differentiate tasks by increasing the level of difficulty or imposing additional conditions, in separate courses (eg foreign language courses and drawing) students can be divided into smaller groups according to their level of knowledge (by checking it in advance).

There are students who already have a clear specific field of work after finishing the University, but not for everyone, and therefore, various types of assignments are given to the students allowing them to express themselves freely in terms of their own interests and experience and also the assignments with determined instructions (limiting students' actions).

Each teaching staff member chooses the most appropriate evaluation and control forms of the course. The evaluation takes place regularly throughout a semester by controlling students, using the forms determined in the course programme (in the item *Learning outcomes* are also determined control forms of knowledge, skills and competence but in the item *Requirements for*

*Getting Credit Points* the formation of evaluation is explained and which independent works and assignments should be done as well as evaluation criteria). Summative assessment of the course can be accumulative but it is also described in each particular course programme.

The student has options to challenge an evaluation or to ask to explain/comment on it. It must be acknowledged that the students want to find out the reasons for the particular evaluation and wait for comments demonstrating that it is important for them to understand their own mistakes. The students also willingly share their impressions on study courses. LLU gives an opportunity both a joint survey of students by the end of the course (a higher level of activity is desirable there) and teaching staff members' request for feedback in their study courses, however, students willingly share their views and recommendations with the Director of the Programme (I suppose that personal contact seems more reliable).

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

The overall the Study Programme provides for a practice of 20 CP (30 ECTS) both for full and part-time 2 CP (3 ECTS) in the first and second year and 8 CP (12 ECTS) for full-time in the third and fourth year, but for part-time in the third and fifth year.

Like in the overall Study Programme (there are more general courses at the beginning of the studies and connection with the profession increases every year), each practice has more in-depth orientation in profession: in practice No 1 a student is an observer and can freely choose a place of practice (the place can be connected with design indirectly, for example, a cultural or crafts centre); in practice No 2 the student is still an observer, but is involved as a performer of work; in practice No 3 the student also assists a designer in parallel, while in practice No 4, in parallel to assisting, the student also is involved in the process of producing new products and in other works, and in an ideal variant the place of practice is linked to the theme of a diploma project (a company can be a place of creating the diploma project). In practices No 3 and 4 the students tend to associate the practice place with the selected specialisation.

Since the Study Programme aims to prepare designers for work in different types of companies, students are promoted to choose a different company each year as far as possible including those which represent different types of entrepreneurship (from individual to bigger companies), to be able to see and analyse various forms of entrepreneurship as well as a set of duties and evaluate own opportunities and desires in professional activity.

Students look for the places of practice by themselves thus deliberately looking for places and fields they are more interested in. During the first year in the frame of the course *Introduction in Studies,* the students make a work on design trends in Latvia, based on an overview of the exhibition *Design Isle* (visiting on-site or searching on the Internet). In parallel students are advised to analyse companies and collect information on opportunities to practice in them. Since 2018 the conference *Design Dialogue* has been organised for students, inviting entrepreneurs ready to share their experience. Here, too, the students have an opportunity to track down or even stay in touch with the entrepreneurs on their place of practice. A number of co-operation contracts/agreements have also been concluded on possible places of practice in the framework of the LLU Programme,

and the students are informed on them (see co-operation contracts/agreements in whole direction report Annex No 2).

Students also have opportunities to use Erasmus+ international mobility in the framework of practices, which was used by only one student in the summer of 2020 so far, but despite of the fact that due to the pandemic situation the practice has been postponed because of a travel risk, it had been carried out successfully and would also encourage other students in the future.

It should be acknowledged that the economic consequences of the pandemic for businesses and the country as a whole are also reflected in students' opportunities to get places of practice. Companies are cautious of entering into practice contracts. So far, however, there have been no cases where someone has failed to find a place of practice.

Many students in practice have helped companies to develop products or create new ones that show the students' ability to demonstrate and develop their competence in designing and working out new products.

**2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.**

In the accreditation period the first six students graduated in 2019/2020 study year. The defence of the Diploma Projects were completely remote on-line in e-learning environment. An average score of 8.2 balls. Two works were marked as the best ones.

In the Commission evaluation, the themes of the Diploma Projects were topical and relevant to students' knowledge and experience. New solutions were sought to improve the urban environment, the interior of public buildings and the problems of small housing as well as were thought about the creation of sustainable things for children. The themes were well substantiated and prototypes were well-designed, and the students' ability to use a variety of materials and combinations of them, despite of concrete specialization, was appreciated.

Suggestions of the Commission:

1. In the written part of the Diploma Project more attention should be paid to: the substantiation of the suitability of the materials used and production technology/-ies; market investigation/survey (better positioning of the place of potential products in the market and appropriate analysis of competition); economic calculations and potential marketing channels (industrial production).
2. If the defence process continues to be remote, make the presentation videos as detailed as possible by zooming in detail and displaying the product in action.

**2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.**

The Programme's first graduates (six students) were in 2019/2020 study year and it should be

recognised that only one person works in the field of design development. Others are continuing Master studies and/or works in the field not related to design, and it would be more appropriately to mention that they continue working in the places they did in parallel to studies. Working in the fields not-related or partly-related to design is understandable because unstable situation caused by pandemic has frightened young people, just finished from their studies, to seek new work actively in own speciality. Some of them have announced that they plan is to start their own business.

All students plan to link their future directly to starting their business. It should be acknowledged that there are students who already started it during their studies and who have their own enterprise or precurse into it. About 30% plan to continue design studies at a higher level, but the majority nevertheless plan to add knowledge in related fields such as entrepreneurship.

Students' opinion has always been heard and assessed. They have always expressed their views on the study process, both responding to questionnaires and on their own initiative. Graduates also recognise that after talks with the latest students they have concluded that improvements have been introduced into life. The main problems identified not only by the graduates, but by all students, is the material-technical basis, which in certain areas of the textile field should be improved (as far as possible, certain improvements have already been made, e.g. purchased machinery and other aids) and attracting working practitioners into the study process (it is a difficult task because salaries are very different, but we have found a solution, attracting entrepreneurs at least once a year to share the experience with the students (the annual conference for the students *Design Dialogue*)).

This conference is considered by all students to be very valuable and necessary, and many have also found places of practice in this way. The number of practices, in general, seems to be very relevant for the students, and the mentioned plus is the possibility to find own practice places by linking to the field of interest. Of course, there is also the unsatisfied part of students, but due to the overall trend, it is clear that unsatisfaction is expressed by the students who are not so motivated in studies or they don't know quite exactly what they want to achieve.

Part-time students are satisfied with the distribution of sessions because it is easy to link them to work. Distance studies are mentioned as an obstacle, particularly in completing practical works, and the part-time students also think about their own companies/enterprises after graduation.

In parallel to specially designed surveys, after completion of study courses every semester, students have an opportunity to evaluate the completed semester courses. The course survey consists of such questions as: Does an academic staff presents learning outcomes at the beginning of the course? How information is explained? What methods are used? What was the feedback? Was the academic staff available for consultations? The students were also asked to assess their participation in the course and to make recommendations for the development of the course. It is difficult to provide the average evaluation because in one and the same course can be various teaching staff members in different study years or some courses can change, e.g. because of the changes of the study plan or offer of free choice in a particular study year. It has to be recognised that not all the students express their views. The average evaluation scores range is 4-4.25 from 5 balls.

Because the Study Programme is new, feedback is received in the frame of the Programme and particular courses. According to the graduates' feedback, the students' views have been heard and improvements have been made, assessing the objectivity of the views or they have been discussed with the academic staff.

Considering the fact that the Study Programme is new, there are only the first six graduates whose

graduation coincided with the pandemic time, which made active job-seeking difficult, the surveys of employers were carried out in the companies (totally eight) which have so far taken the most of the students to them.  Although all the companies are related to the field of design, each is specific enough and therefore training is needed starting to work, but after short introductory training, the students are able to continue working on their own, which means that they are able to quickly adapt to changing situations and learn new skills and technologies.  The majority of employers (91%) emphasize that young people are interested and determined and it promotes rapid adaptation. It is evident that if the students have been involved in the field of design or crafts before studies, they are more independent.

In general, employers recognise that trainees are able to demonstrate the specific knowledge of the profession, perform professionally, take responsibility and work in a team, as well as solve problems.

Almost all of the surveyed employers are also willing to organise excursions to them or share the experience. Several of them have already done it, participation in the students' conference *Design Dialogue*

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

Students have used the opportunities offered by  Erasmus + both for mobility studies and mobility practices. In the field of design, LLU has signed contracts with the following partner higher schools: National College of Art and Design in Ireland, Suleyman Demirel University in Turkey and Siauliai University in Lithuania, but the students also have the opportunity to offer a higher school chosen by them and after mutual agreement, it is possible to sign the contract and study in Erasmus+ programme also in other higher schools.

2018/19 study year one student studied at LUCA School of Arts in Gent, Belgium.

2019/20 study year two students studied at Escola Superior de Artes e Design (ESAD) in Portugal, but one student practised at the enterprise Clan de Banlieue in the Netherlands.

2.7.1. table

**LLU students' mobility**

| ***Study Programme*** | ***ERASMUS+*** | |
|---|---|---|
| | ***SMS**** | ***SMP**** |
| ***Design and Crafts, p(b)*** | 3 | 1 |

*SMS – mobility studies

**SMP – mobility practice

All courses and practice passed out of LLU have been aligned.

The second year student participated in the European competition of professional excellence for young people EuroSkills 2018 as an ambassador (Available: https://worldskills.org/media/news/european-vocational-skills-week-ambassador-katrina-elizabete-sile/).

Foreign students have not studied in the study program within the framework of inbound mobility of ERASMUS.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

The implementation of the Study Programme is ensured by the Director of the Programme, Methodological Commission of the Education direction of the Faculty of Engineering and the Dean. Support of administrative and technical staff is sufficient to ensure the achievement of study results. The Programme basically is ensured by the Institute of Education and Home Economics (IMI), but because of the Programme's Interdisciplinarity, seven of eight LLU faculties are involved in its implementation, where each course which is under the guidance of a particular faculty, is acquired using equipment and rooms of the faculty. In Annex *DC_material/technical_ensurance,* a list of entities, rooms and particular equipment is available.

IMI has previously carried out the Study Programme *Home Environment in Education*, which means that the Institute has both teaching staff and material bases for developing of the field of textile technologies. Whereas the material basis was more linked to the acquisition of hand works, the Licensing Commission for the Study Programme in 2016 accepted specialization *crafts/artisanal textile technologies and design*. In the framework of the ERAF project „Modernisation of LLU STEM Study Programmes" Nr. 8.1.1.0/17/1/001, the material base was supplemented with additional equipment for a sewing workshop like-new sewing machines, an embroidery machine, an overlock machine, mannequins, steam-ironing systems, as well as a set of physical-mechanical properties testing appliances, and purchased knitting-machines for the workshop of textile technologies. In the framework of the same project also 3D printer and a set of Unimat timber drilling, frowning and swirling (turning) appliances were purchased (Prototyping Laboratory) (Annex *DC_material/technical_ensurance*).

W*ood/metal technologies and design* specialisation has a good resource provision in the Institute of Motor Vehicle of the Faculty of Engineering (metal technologies) and the Chair of Timber (wood technologies) Processing of the Faculty of Forestry.

Due to the fact that in the framework of ERAF project „Modernisation of LLU STEM Study Programmes" Nr. 8.1.1.0/17/1/001 (2017-2021) modernisation of rooms and equipment is being

carried out in the Faculty,  there has been limited usage of the rooms and equipment since September 1, 2019, students have mentioned this encumbrance in surveys.

In parallel to full-time studies, as well as in distance studies during the Pandemic period, the students have the opportunities to study by using e-environment and e-learning means, as well as to keep in touch with the academic staff electronically. Study materials are inserted in the LLU e-studies Moodle e-environment, which is available in the data site http://estudijas.llu.lv/.

LLU Fundamental Library contains a wide collection of special literature and access to diverse databases https://llufb.llu.lv/en, Wireless Internet, learning materials collected/prepared by teaching staff, and a lot of literature is in IMI Information Centre or private collections of the teaching staff, and all this is available for independent studies.

Searching for information at LLU Fundamental Library (FL) is possible in several ways:

- databases (AGRIS, databases developed by LLU Fundamental Library staff, electronic catalogues of LLU Information Centres and Offices, as well as subscribed databases;
- Collections of LLU Fundamental Library (agriculture - 38%, natural sciences - 10%, social sciences – 24%, technique - 19%, other fields of science - 9%);
- Internet resources (encyclopedias, dictionaries, etc.);
- information seekers and portals (*CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer LINK,* ).

LLU FL also offers interlibrary and international interlibrary subscription (loans) services, as well as opportunities to use the programmes *Autodesk EDU Master suite 2018 (AutoCAD, AutoCAD Structural Detailing, Autodesk Robot Structural Analysis professional, etc.), CorelDRAW X7, SPSS Statistics v21, VISIO 2013.*

Cooperation with the Jelgava City Library (JCL) has been established, and the LLU FL staff share with students information on how to use the databases subscribed (loaned) by JCL and the differences in access to databases in LLU FL and JCL, so the range of literature for students is becoming wider.

The amount of State-funded study places is agreed in a trilateral contract between the Ministry of Education, the Ministry of Agriculture and LLU. In the Trilateral Contract on financing for 2020 it is defined that the base costs of one study place is 1518.98 EUR, the study level coefficient for Bachelor study programmes is 1 and social security of one study place is for the Bachelor programmes is 164.34 EUR, the coefficient of the costs of the education thematic field for the Professional Bachelor Programme “Design and Crafts” is  1.8 (according to the Regulatory Act of the Cabinet of Ministers of the Republic of Latvia  No 994 “Procedures (order) of Financing Higher Schools and Colleges from the State Budget Funding” (12/12/2006)), and the costs per one student in the Professional Bachelor Programme “Design and Crafts” amount to 2898.03 EUR (Table 3.1.1.).

Table 3.1.1.

Changes in the costs of one base funding study place, 2017-2020

| Year | Costs of one base funding study place, EUR | Costs per one student, EUR |
|---|---|---|
| 2017 | 1393.33 | 2672.13 |
| 2018 | 1458.51 | 2788.55 |
| 2019 | 1518.98 | 2897.83 |

| | | |
|---|---|---|
| 2020 | 1518.98 | 2898.03 |

LLU Senate accepts the distribution of LLU Entire Budget revenue and expenditure every year, which is prepared in accordance with the annual Law accepted by Saeima "On the State Budget" and annual order by LLU rector "On the Planning of LLU Entire Budget". An independent sworn auditor carries out the control and audit of the Entire Budget, whose finding an overall report is examined and confirmed by the Senate.

Before confirmation of the distribution of LLU Entire Budget revenue and expenditure at the Senate, it is examined, discussed and confirmed by the Working Group of Resource Usage and Development, which consists of the Rector, Vice-Rectors, Financial Chancellor, LLU Director, Deans of all the Faculties, Head of the Resource Accounting Centre/Chief Accountant, Head of the Financial Planning Centre, Chief Economists, Major Specialists of Real Estate and Legal Issues.

The distribution of revenue and expenditures confirmed by LLU Senate determines that 80% of the allocated financing by the state are reimbursement costs and 20% are the rest of the costs. From study fee financing, 60% are reimbursement costs and 40% are the rest of the costs, from which 20% are at the direct disposal of the Faculty implementing a particular study programme.

The amount of the funding from the scientific base is calculated and allocated annually considering scientific activities. 50% of the science funding base is at the direct disposal of the Faculty and 50% are for centralized costs. Science financing consists of financing for projects.

The total distribution of the LLU Entire Budget is made by the estimates of departments/faculties, where the costs are envisaged according to the kind of costs.

In 2020 the proportion/share of the costs of the Bachelor Study Programme "Design and Crafts" consists of:

- salary – 77%;
- scholarships – 6%;
- goods and services – 16% including utilities – 6%;
- developing of equity – 1%.

The study fee in the Programme in 2019/2020 study year was 850 EUR in full-time studies and 650 EUR in part-time studies.

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

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

At the time of licensing 39 teaching staff members were planned for the implementation of the Programme.

Yearly changes of teaching staff involved in the implementation of the Programme are shown in Table 4.1.1.

Table 4.1.1.

**Changes of teaching staff involved in the implementation of the Programme "Design and Crafts"**

| ***Position*** | ***2016/2017*** | ***2017/2018*** | ***2018/2019*** | ***2019/2020*** |
|---|---|---|---|---|
| Professors | 1 | 5 | 9 | 8 |
| Associate professors | 2 | 2 | 2 | 4 |
| Assitant professors | 4 | 8 | 10 | 12 |
| Lecturers | 12 | 13 | 15 | 18 |
| Assistants | - | 1 | 1 | - |
| Senior researchers | 2 | 10 | 15 | 14 |
| Researchers | - | 1 | 1 | 3 |
| **Totally (only teaching staff)*** | **19** | **29** | **37** | **42** |

* a part of teaching staff simultaneously takes the position of researcher/senior researcher

Whereas 2016/2017 was the starting year of the Programme, then in the first years the table shows only those teaching staff members who took lessons (only the academic staff of the first year courses in 2016/2017; only the teaching staff of the first and second year courses in 2017/2018, etc.). In 2019/2020 a full number of the teaching staff involved in the implementation of the Study Programme is shown (42 teaching staff members).

Annually there are small changes in the number of teaching staff because somebody had left or guidance of a study course had been offered to another person (on their own wish or according to the opinion of the director of a particular institute/Programme director (it is usually connected with students' suggestions or academic staff assessment by the students)), and there are also attempts to involve specialists from industry or field.

The relationship between a position and study quality is not crucial, because it is important here that the teaching staff should have practical experience in the field itself (e.g., own company /professional activity in the field or parallel artistic activity), and ability to motivate and inspire students. The majority of lecturers (43%) who are less involved in scientific activities, work professionally in parallel to their job at LLU (17% have their own company, 22% work professionally in the field, 22% perform artistic activities).

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

Regulatory laws/acts (The Law of Higher Schools of the Republic of Latvia and LLU Regulation on Academic Positions) establish the electoral procedure for academic positions (for six years), which certify the conformity of the academic and professional qualification of a person to both study and research work. The number of professors, associate professors and docents positions in the relevant sub-fields of science according to financing opportunities and necessity in relation to the implementation of study programmes is determined by the Senate according to the Development Strategy of LLU, but their qualification during the election is evaluated by the Council of Professors of the appropriate field of science. A number of positions of lecturers and assistants is determined according to the study programmes implemented by the Faculty, the number of students and financial opportunities, and the number is proposed by the Dean and Vice-Rector, and approved by the Rector, but evaluated and elected by the Council of the Faculty.

28 teaching staff members take elected positions in the Programme, including eight professors, four associate professors, nine docents and five lecturers, others take a “visiting” status.

A “visiting” status does not mean worse qualification, but it means joining of positions also in other institutions, a limited number of elected positions or the fact that the main job is somewhere else (e.g., in the field of production) and he or she participates periodically in the implementation of the Programme.

As regards the training of teaching staff, LLU has established the Motivation System of Academic Staff (Decision No 2.4.-13/8 (29/11/2017) by the Council of Studies), which annually evaluates the professional development of each teaching staff member.

The professional development Programme “Innovations in Didactics of Higher Schools” has been established at LLU (160 CP = 240 ECTS) for the promotion of qualification once in six years. The Programme consists of modules addressing multisided themes on topicalities in higher education, methodology, recent trends in acquiring study courses, tools of presentation, work in e-studies, psychology issues, work in several groups and with foreign students, etc.

In addition, the teaching staff can develop themselves professionally, participating in the Academic Conference organised by LLU, in which other topical themes related to the study process are passed through. The issues of education and design are addressed in the annual International Conference “Rural Environment. Education. Personality.” organised by IMI, but topicalities of real work teaching staff can acquire together with students attending the practical conference for the students “Design Dialogue”, where entrepreneurs and designers share their experience.

In LLU project “Development of LLU Academic Staff” (No.8.2.2.0/18/A/014) the teaching staff has an opportunity to supplement their knowledge in the English language, while in the project “Development of LLU Management” (No 8.2.3.0/18/A009) programme directors could acquire knowledge of improving study content and quality management.

Both students and teaching staff can take advantage of the opportunities offered by the

International Exchange Programme Erasmus+, both lecturing abroad and participating in sharing experience. The number of exchange places for the teaching staff depends on the number of incoming students in a previous year and it is determined by the State Education Development Agency (VIAA), signing a contract with LLU,  on the basis of which the Rector's Order is issued.

Since particularly intensive usage of the virtual environment in 2020, teaching staff members have supplemented knowledge in the usage of various interactive presentation tools and cloud services in organised seminars by Zemgale Region Human Resource and Competences Development Centre (ZRKAC) to make distance lectures more attractive.

Teaching staff members of special study courses (such as drawing, form training, technology courses, etc.) are actively taking advantage of acquiring new trends or skills in various courses, seminars and master classes.

The professional development activities of teaching staff are listed on each person's CV.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

As the field of design is linked to the cultural and creative industries, the teaching staff of the Study programme "Design and Crafts" is more linked to artistic creation, making creative works, participating in various exhibitions and symposiums, developing their own personal exhibitions and also co-operating with foreign colleagues.  They represent or participate in various organisations, are members of Jelgava Artists Association, lead the studies of applied art, take part in various associations and organisations, leading master-classes in both non-formal and continuing education for adults.

As far as possible, exhibitions are visited in Latvia and abroad in order to seek inspiration and to be in line with the latest trends in creative fields. The information obtained is used in study courses.

As there is an exhibition hall on the first floor of the Faculty of Engineering, the teaching staff of the Programme together with students organise exposures, and the students in this way not only demonstrate their work done during studies but also acquire skills in exposing works and arranging exhibitions.

IMI, under which guidance is the Programme, has been organising the International Scientific Conference "Rural Environment. Education. Personality. (REEP)" (https://www.llu.lv/en/conference-rural-environment-education-personality), already for 14 years, in which since the beginning of the implementation of the Study Programme in 2016, in parallel to the fields of education, is also the Section of Design and Crafts. Whereas the Conference has been known only in the field of educational sciences in many years, it has to be recognised that the Section of Design and Crafts is not widely represented, however, there are a few articles, posters and master-classes in the Section each year.

Whereas many teaching staff members are involved in parallel in the programmes of educational sciences implemented by IMI, the activities of scientific research are more represented in this field.

The scientific research and artistic activities of teaching staff are listed on each person's CV.

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

The co-operation of the teaching staff involved in the Programme can be evaluated as almost good. A part of them co-operate very well, some of them less. Better co-operation is among IMI teaching staff members, but it is worse with the teaching staff from other involved institutes or faculties, which could be due to the fact that people who are personally more familiar are more in contact with each other, as well as each person's individual peculiarities and opportunities to meet in person (communication by e-mail or telephone does not contribute to creation of a positive environment) have to be taken in account.

Study courses in the Programme are planned considering mutual sequence as much as possible, and sometimes aligning of credit points in the frame of one semester is hampered. However, teaching staff members are interested in what is taught in other courses and plan the acquiring of themes to avoid overlapping or reveal the theme from another standpoint.

Students are promoted to continue to develop the work done in the frame of one particular course on a higher level in another course, for example, to use a previous composition developing a new product or to make a prototype in another course from the idea developed in the previous course, thus seeing how the idea develops.

The second-year students are already promoted to think about the Diploma Project when they carry out research in the frame of the study course *Data Obtaining and Processing.* During working out the Diploma Project (throughout the last year of studies) there are three shows till pre-defence, where the students present their works. Not only Project supervisors, but also other teaching staff

members involved in the Programme able to benefit or advise the students during working out the Project, are invited to the shows. This is an opportunity to understand the students' aspirations or difficulties, or what issues need more attention leading a study course.

At the moment of submission of the Accreditation Report, the ratio of students to teaching staff in the Programme is 13.5 (at the University as a whole 13.2).

# Annexes

| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
|---|---|---|
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | 5_annex_statistical_data_on_students.docx | 5_pielikums_statistikas_dati_par_studejosajiem.docx |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | 6_annex_DA_compliance_with_the_standard.docx | 6_Pielikums_DA_atbilstiba_izglitibas_standartam.docx |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | 7_annex_DA_compliance_with_profession_standart.docx | 7_pielikums_DA_atbilstiba_profesiju_standartam.docx |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | 8_annex_DA_study_course_mapping.xlsx | 8_pielikums_DA_studiju kursu kartejums.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | Dizains_un_amatnieciba_study_plan_20_21.xlsx | Dizains_un_amatnieciba_plans_20_21.xlsx |
| Descriptions of the study courses/ modules | Design_and_crafts_courses_programmes.rar | Dizains_un_amatnieciba_kursu_programmas.rar |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | DA_diploma_supplement_ENG.zip | DA_diploms_pielikums_LV.zip |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | Agreement_LLU and RTU_Production and processing _ENG.pdf | vienosanas_LLU_RTU_LV.rar |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | | |
| Sample (or samples) of the study agreement | Study_Agreement_LV_EN_2020.pdf | Studiju_ligums.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | | |

# Wood Processing (42543)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Wood Processing* |
| Education classification code | *42543* |
| Type of the study programme | *Professional bachelor study programme* |
| Name of the study programme director | *Sigita* |
| Surname of the study programme director | *Liše* |
| E-mail of the study programme director | *sigita.lise@llu.lv* |
| Title of the study programme director | *Docente, Dr.silv.* |
| Phone of the study programme director | *26814105* |
| Goal of the study programme | *The objective of the study programme 'Wood Processing' is to provide students with fundamental and theoretical knowledge, to prepare comprehensively trained specialists for research and practical work, who are able to manage woodworking processes and resources in companies of various types and sizes or to hold leading positions in private companies and public institutions.* |
| Tasks of the study programme | *1. To provide theoretical knowledge and practical skills for students to be able to successfully work in the following directions – mechanical wood processing, product quality assessment, and environmental protection, etc.*<br>*2. To provide students with theoretical knowledge and to promote the acquisition of research skills, to develop analytical abilities and the ability to solve problems independently by preparing students for further studies and scientific work.*<br>*3. To prepare specialists who are able to carry out comprehensive business organisation and management, to manage, administer and analyse the resources of companies, to solve problems independently, as well as to implement innovative management ideas.* |

| | |
|---|---|
| Results of the study programme | *Upon mastering the professional higher education study programme 'Wood Processing', graduates have a sufficient level of theoretical knowledge, research skills, and abilities for further scientific research studies and practical activities. Graduates of the programme shall acquire comprehensive theoretical and professional skills, as well as work skills required in production, which shall give them the opportunity to successfully work in production-related positions of various wood primary-processing and deep further- processing enterprises, to choose jobs in the business and management that meet their interests. The graduates are competent and knowledgeable in building their own businesses or working in institutions and organisations of various levels, both nationally and internationally.*<br>*Higher education programme 'Wood Processing' is designed to be included in the organisationally unified methodological cycle with the academic master's higher education programme 'Wood Materials and Technology'.*<br>*By mastering the study courses included in the study programme, students acquire in-depth knowledge of the micro and macro structure of wood, wood materials, their properties, and the main direction types of use. The theoretical knowledge given in the acquisition of studies provides skills for the selected wood material to select and develop an appropriate technology, to create a business plan for the implementation of the developed technology. Upon mastering the study programme, students are competent to independently manage the established company, to develop new wood products and develop a marketing plan for their successful promotion in the market.* |
| Final examination upon the completion of the study programme | *Diploma Thesis* |

# Study programme forms

**Full time studies - 4 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *4* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Professional Bachelor Degree in Wood Processing Technologies* |
| Qualification to be obtained (in english) | *Engineer of Wood Processing* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Part time extramural studies - 5 years - latvian**

| | |
|---|---|
| Study type and form | *Part time extramural studies* |
| Duration in full years | *5* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Professional Bachelor Degree in Wood Processing Technologies* |
| Qualification to be obtained (in english) | *Engineer of Wood Processing* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

## 1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction

The study programme is organised in accordance with the legislation of the Republic of Latvia and the provisions of the Professional Standard PS 2141 12 'Wood Processing Engineer'. In 2020, the updating of the 'Wood Processing Engineer' (PS 2141 12) standard was started, which is still taking place by involving delegated representatives of the Latvian Forest Industry Federations and large, medium, and small wood processing companies of Latvia in the working group, covering all stages of wood processing – pre-processing, further processing, and deep processing. Thus, the updated professional standard will be developed by supporting the needs of the industry – higher professional education based on professional competencies, skills, knowledge, and the attitude of a particular employee.

In previous years, the full-time and part-time study programme 'Wood Processing' was improved and modifications in the study courses were made in accordance with the General Guidelines of the LLU Development Strategy for the Improvement of the Study Process. The number of credit points of several study courses was increased to at least 2.0 CP; several theoretical basic courses of the industry from part B2 of the plan are included in the professional specialisation courses in part B3. Plan of the programme became less fragmented, the results of the study courses to be obtained were linked between the B2 and B3 parts of the programme, thus, ensuring a smoother transition. The first academic year includes a larger proportion of study courses with professional specialisation courses in the field, which created more interest in students in studies and less dropping out in the first year of studies.

The most significant modifications within the framework of the study programme improvement have taken place in the period from 2016–2018.

**2016/2017 academic year**

Within the framework of the improvement of the study programme, changes have been made in several study courses (in both full-time and part-time studies).

Table 1.1.1

**Changes in the study study programme 'Wood Processing'**

| No. | Combined study courses (volume, LLU code) | Developed study course from the combined study courses (volume, LLU code) |
|---|---|---|
| 1. | Economic Theory (1.5 CP, Ekon1002)<br>Accounting and Bookkeeping (1.5 CP, Ekon2044) | Bioeconomic and Accounting (2 CP, Ekon3125) |

| No. | Combined study courses (volume, LLU code) | Developed study course from the combined study courses (volume, LLU code) |
|---|---|---|
| 2. | Labour and Civil Protection (2 CP, Citi4016) Ergonomics (1 CP, Citi4001) | Labour and Civil Protection (3 CP, Citi4011) |
| 3. | Research Methodology I (1 CP, MežZ3032) Research Methodology II (1 CP, MežZ3001) | Methodology of Research (2 CP, MežZ3077) |
| 4. | Automation of Wood Processing (2 CP, ETeh4029) Electrical Engineering and Industrial Electronics (2.5 CP, Ener3024) | Mechatronics (4 CP, ETeh3032) |
| 5. | Hydrothermal Treatment of Wood I (1 CP, MatZP020) Hydrothermal Treatment of Wood II (1 CP, MatZP021) | Hydrothermal Processing of Wood (2 CP, MatZP008) |
| 6. | Production of Laminated Materials I (1 CP, MatZP028) Production of Laminated Materials II (1 CP, MatZP029) | Production of Glued Materials (2 CP, MatZP007) |
| 7. | Production of Wood Products I (1 CP MatZP024) Production of Wood Products II (1 CP, MatZP025) | Manufacturing of Wood Products 2 CP (LLU code MatZP009) |

The study course Ecology and Environmental Protection 2 CP (LLU code VidZ3006) has been updated by modifying the curricula and name to Eco Management Systems 2 CP (VidZ1002). Increased number of credit points of the study course Hydrothermical Processing of Wood from 3 CP (LLU code MatZ3048) to 5 CP (LLU code MatZ3060), supplementing it with elements of heat engineering; Manufacturing of Wood Products - from 3 to 4 CP (LLU code MatZ3057); Chemical Technologies of Wood 1.5 to 2 CP (LLU code MatZ3058). Increased number of credit points of the study project Hydrothermical Processing of Wood from 1 to 2 CP (LLU code MatZ3057). Reduced number of credit points of the study course Production of Glued Materials from 3.5 CP to 2 CP (LLU code MatZ3061). This is partly related to the regulations adopted by LLU that the volume of a study course shall be at least 2 CP. Thus, students shall also have a better understanding of the study courses included in the study plan, greater linkage of study courses, as well as a smaller number of lecturers, including a smaller number of tests and exams (reduced by 15%), which also reduces the potential of unsuccessful study courses by 20%.

**2017/2018 academic year**

Within the framework of the improvement of the study programme, changes have been made in several study courses (in both full-time and part-time studies). In the study programme, work has been continued on the implementation of the study plan for the students who started their studies in the undergraduate study programme ‘Wood Processing’ in the 2015/2016 academic year. Modifications in the study courses are summarised in Table 1.1.2.

Table 1.1.2

**Changes in the study programme ‘Wood Processing’**

| No. | Combined study courses (volume, LLU code) | Developed study course from the combined study courses (volume, LLU code) |
|---|---|---|
| 1. | Timber Trade (1.5 CP, MežZ4042)<br>Wood Processing Economics (1.5 CP, MežZ4054)<br>Entrepreneurship in Wood Processing Companies (2.5 CP, MežZ4057) | Entrepreneurship in Timber Industry (5 CP, MatZ4014) |
| 2. | Basics of Industrial Construction (1.5 CP, Arhi4013)<br>Design of Wood Processing Plants (1.5 CP, MatZ3036) | Planning of Wood Processing Enterprises (3 CP, MatZ3064) |

The name of the study course Entrepreneurship in the Industry (8 CP, MatZP014) has been changed to Business in Sector (8 CP, MatZP037), Entrepreneurship in Wood Processing Companies (MežZ1011) to Entrepreneurship in Timber Industry (MatZ4015) and the number of credit points has been increased from 1.5 CP to 2 CP. The number of credit points of the study course Manufacturing of Wood Products from 1.5 CP (MatZ4010) to 2 CP (MatZ4004) has been increased. Compulsory term papers/projects have been introduced in the following study courses: Finishing of Wood Materials (2 CP, MatZ4013), Production of Plywood or Wood Based Panels (2 CP, MatZ3027), Finishing of Wood Materials (2 CP, MatZ4013), Planning of Wood Processing Enterprises (2 CP, MatZ3065). During the spring term of the 4th year, students no longer have theoretical studies, but the term is to be dedicated to the internship in the Commercial Activities in the Timber Industry and the development of DT 12 CP. In turn, part-time students, according to the new study plan, within the 5th year, will have a similar situation in the spring semester Business in Sector II (4 CP, MatZP036), but the internship will be partially implemented in the 4th year study course Business in Sector I (4 CP, MatZP035). This type also makes it easier for students to perceive the study courses included in the study plan, ensures a greater linkage of study courses, as well as a smaller number of lecturers, including a smaller number of tests and exams.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

Despite the fact that since the accreditation of the study programme ‘Wood Processing’, there has been a declining dynamic in the number of students, in recent years, the number of students has stabilised and reaches 65 to 70 (Figure 1.2.1 Appendix 1). It should be noted that in general, the country is experiencing declining demographics and a decline in demand among young people to study engineering professions. Although the study programme ‘Wood Processing’ demonstrates a similar trend as in the country, the programme has even been able to demonstrate an increasing trend, because last year, the number of new entrants exceeded 30 (previously 20-25). For example, in recent years, maintaining a stable number of enrolled students and applying it to the total number of young people graduating from general education institutions, it can be concluded that among young people we can evaluate the competitiveness of the Wood Processing programme as very good.

Full-time students are mainly non-working students, who are mostly studying after graduation from general secondary education. In the 2013/2014 academic year, the number of full-time students was highest (108); in the following academic years, there is a gradual decrease in the number to the lowest point ever, which was reached in the 2018/2019 academic year – 67 (see Annex 1).

Part-time students are employed, among them, in the forest sector. The need for education is often linked to the challenge of climbing the career ladder, as well as to broadening the field of vision and contacts. In the period from 2013 to 2020, the decrease in the number of students is related to the low demand of the industry and the transition to a higher level of automation in the industry.

Analysing the changes in the number of part-time students in the study programme, it can be concluded that the number of enrolled students fluctuates every year. It ranges from 5 to 10 students. From 2014 to 2020, in two academic years, less than 5 students applied for part-time studies, thus, not allowing commencement of the implementation of the programme in the specific academic year. During this period, there is a general low level of interest among potential students. Acquisition of this study programme is difficult for part-time students, which could also be explained by the low support of employers during the study process. The number of part-time graduates is volatile and changes in the number correlate with the number of students enrolled, however, in recent years, there has been some stabilisation.

The most significant decrease in the number of students is observed after the first and second academic year (36% and 35%, respectively). In the later study courses (Fig. 1.2.3 and 1.2.4 Annex 1), there is no significant decrease in the number of students.

The main reasons for students already leaving their studies in the 1st year are mainly as follows: 17% have not fulfilled the requirements of the study programme, 7% have not fulfilled financial obligations, 14% have not commenced studies, which means that the student has changed their choice. 20% discontinued their studies at their own will without giving an additional reason. The largest dropout rate during the 1st year is in 2013, when 48 students dropped out. In recent years, this number has significantly decreased, e.g., in 2018, 25 students quit their studies, but in 2019 and 2020, it was 21 and 19, respectively, or 10% to 15% of those admitted. The reason for the decrease in attrition is the more active involvement of the curator of the respective student course, who approaches the student at the moment when the issue of failure for a particular student in a particular study course has to be addressed.

In the second academic year, the main reasons for the termination of studies are: 15% of cases for non-fulfilment of the requirements of the study programme, 5% for the non-fulfilment of financial obligations and 11% involve one's own choice without indicating a specific reason.

In the third academic year, the main reasons for the termination of studies are similar: namely, 8% for not fulfilling the requirements of the study programme and 4% for not fulfilling financial obligations.

In the fourth academic year, regarding the termination of studies, 6% was for not fulfilling the requirements of the study programme, and 4% for not fulfilling financial obligations. Non-fulfilment of the requirements of the study programme is also related to the final work elaboration, where students do not successfully defend the pre-viva of the final - Diploma Thesis (DT) and are forced to terminate their studies. Most of these students try to develop the DT again next year and defend it.

The reason for the termination of studies of 8% of part-time students is due to the non-fulfilment of the requirements of the study programme. And the reason for this is a large proportion of engineering study courses in the study plan, which means extensive and complex calculations, as well as time-consuming processes in the use of design programmes.

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.**

The study programme meets the requirements of the wood processing industry and the conditions of the professional standard PS 2141 12 'Wood Processing Engineer'. The title of the 'Wood Processing Engineer' professional standard includes a wide range of competencies, which is characterised by the title of the programme. The degree and qualification to be obtained is 'Professional bachelor's degree in Wood Processing Technologies and the qualification of a wood processing engineer' (5th professional qualification level) and fully covers the industry demand for a modern and independent specialist who is competent to evaluate issues from various points of view when making decisions. Fully knows both wood processing and technologies, from the preparation of raw materials to the production and sale of wood products.

The employment description of the professional study programme 'Wood Processing' provides that:

- the wood processing engineer manages various wood processing companies (sections) of the economic operator, i.e., sawmills, veneer and plywood factories, wood panel plants, furniture factories, etc. or works as a self-employed person or sole proprietor, works in state or local government institutions and other organisations as a production manager, wood processing consultant, advisor;
- plans technological processes of wood processing and makes decisions regarding the implementation of these processes;
- obtains and analyses information and prepares proposals for the definition of strategic objectives;
- ensures production conditions corresponding to the labour protection requirements;
- manages the technological processes of wood processing enterprises;
- performs pedagogical and scientific activities in the field of wood processing.

In the professional standard, the above-mentioned description of employment accurately describes the total results to be achieved in the study process, which are systematised and summarised in the following knowledge, skills and competencies required by the timber industry:

***Knowledge:***

- To provide theoretical knowledge for students to be able to successfully work in the following directions – mechanical wood processing, product development and quality assessment, and environmental protection, etc.;
- to provide students with theoretical knowledge and to promote the acquisition of research skills.

***Skills:***

- to provide practical skills so that students can successfully work in the following directions – mechanical wood processing, product development, and quality assessment;
- to develop analytical abilities and the ability to solve problems independently, preparing students for further studies and scientific work.

***The following competencies*** are required to achieve the results:

- to be able to perform comprehensive business organisation and management;

- to be able to manage, administer, and analyse the resources of enterprises, to solve problems independently and to implement innovative management ideas.

Graduates of the programme acquire comprehensive theoretical and professional skills, as well as work skills required in production, which shall give them the opportunity to successfully work in production-related positions of various wood processing and furniture manufacturing enterprises, to choose jobs in the business and management that meet their interests.

Professional standard PS 2141 12 'Wood Processing Engineer' determines the duties and tasks to be performed. In total, the standard describes 7 main responsibilities (management of wood processing technological processes; planning of work of wood processing enterprises (departments) and
organisation; acquisition and analysis of information; qualification improvement; knowledge of used machines, instruments, tools; organisation and control of environmentally friendly production processes; provision of fire safety measures in the enterprises). The set of required knowledge is divided into six parts:

1. General education courses – a total of 9, with a total amount of 20 CP;
2. Theoretical basic courses of the industry – a total of 14, with the total amount of 37 CP;
3. Professional specialisation courses – a total of 26, with the total amount of 65 CP;
4. Elective courses with a total amount of 6 CP;
5. Final paper development (Diploma Thesis) 12 CP;
6. Production internship – in total 1, with a total amount of 12 CP;
7. Professional internship – a total of 6, with a total amount of 12 CP (see the annex WOOD PROCESSING study plan).

After mastering the general education study courses, students acquire general basic knowledge, skills and competencies; after mastering the basic theoretical courses and traineeship of the field, students acquire theoretical knowledge in the field of wood processing and understand their application in practice; after the acquisition of professional specialisation courses and professional internship in the field, students acquire skills and competencies in the application of theoretical knowledge. And in recent years, more and more emphasis in the acquisition of the study programme is placed on study courses that contribute to the knowledge of various business conditions. The reflection of knowledge and skills is realised by developing and defending the DT in the State Examination Commission (hereinafter – SEC).

By mastering the study courses included in the study programme, students acquire in-depth knowledge of the micro and macro structure of wood, wood materials, their properties, and the main types of use. The theoretical knowledge given in the acquisition of studies provides skills for the selected wood material to select and develop appropriate technology, to create a business plan for the implementation of the developed technology. Upon mastering the study programme, students are competent to independently manage the established company, to develop new wood products and develop a marketing plan for their successful promotion in the market.

Professional bachelor's degree in materials engineering and the qualification of a wood processing engineer is obtained after acquiring the theoretical and practical courses of the professional higher education study programme 'Wood Processing' and after the successful diploma thesis elaboration and defence in the State Examination Commission.

The final - Diploma Thesis (DT) is an independent analytical piece of research with elements of scientific work, in which the undergraduate, based on the theoretical knowledge and practical skills acquired during the studies, carries out original research on current problems and develops proposals and recommendations significant for society.

Considering the language of implementation of the study programme, one of the admission requirements is the centralised exam in Latvian. During the acquisition of the study process, it is necessary to study literature in one of the foreign languages, which is necessary for the potential specialist to be competitive and be able to base decisions on scientific knowledge; therefore, there is a requirement of passing the centralised examination in a foreign language (in accordance with Cabinet Regulation of the Republic of Latvia adopted on 29 September 2015 No. 543 the centralised examination of a foreign language may be replaced by the assessment of an international test). Knowledge of foreign languages is additionally required both in the development of various papers and through the opportunity to participate in mobility programmes. Considering the engineering subjects, it is additionally necessary to present the centralised exam in mathematics. Considering the fact that persons who have obtained their secondary education before 2004 or have been exempted from the centralised exams also want to prove their studies, they shall also prove their knowledge in Latvian, a foreign language and mathematics. Proof of knowledge is the average mark of the certificate/diploma or passed centralised exam.

The **objective** of the study programme 'Wood Processing' is to provide students with fundamental and theoretical knowledge to prepare comprehensively trained specialists for research and practical work, who are able to manage woodworking processes and resources in companies of various types and sizes or to hold leading positions in private companies and public institutions.

**Tasks** of the study programme:

- To provide theoretical knowledge and practical skills for students to be able to successfully work in the following directions – mechanical wood processing, product quality assessment, and environmental protection, etc.
- To provide students with theoretical knowledge and to promote the acquisition of research skills, to develop analytical abilities and the ability to solve problems independently by preparing students for further studies and scientific work.
- To prepare specialists who are able to carry out comprehensive business organisation and management, to manage, administer and analyse the resources of companies, to solve problems independently, as well as to implement innovative management ideas.

Upon mastering the professional higher education study programme 'Wood Processing', graduates have theoretical knowledge, research skills, and abilities for further studies and practical activities. Graduates of the programme acquire comprehensive theoretical and professional skills, as well as work skills required in production, which shall give them the opportunity to successfully work in production-related positions of various wood primary-processing and further-processing enterprises, to choose jobs in business and management that meet their interests. The graduates are competent and knowledgeable in building their own businesses or working in institutions and organisations of various levels, both nationally and internationally.

Higher education programme 'Wood Processing' is designed to be included in the organisationally unified methodological cycle with the academic master's higher education programme 'Wood Materials and Technology'.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

### 2.1. Assessment of the relevance of the content of the study course/ module and the

**compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

Study programme curricula – the specific study courses and their curricula are developed on the basis of the knowledge, skills, and competencies specified by the professional standard Wood Processing Engineer (code 2141 12; available at https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0236.pdf) (*in Latvian*), as well as the defined tasks and strategic objective of the programme.

The updating of study courses is provided based on the suggestions and recommendations of the Council of Advisors of the Forest Faculty. The linkage of the study programme with the relevant issues to the industry is discussed in meetings of different levels, where representatives from different types of business update the knowledge that would be necessary for the graduate. The director of the additional programme follows the development trends of the industry, and in cooperation with the departments and the lecturer of the study course, updates the course content. The student association *Šalkone* of the Forest Faculty is also involved in the improvement of study programmes.

Study programme is updated and improved in accordance with the LLU development strategy. University teachers of study courses are invited to review their study courses once a year and update their content considering the latest trends in the field of wood processing. This is done considering the set of knowledge, skills and competencies acquired by the lecturers during the implementation of the LLU study improvement project – the tools offered by computer systems, knowledge of the foreign language, and the principles of good management in ensuring the direct study process.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The study courses are designed and the results to be achieved are determined in accordance with the objective of the study programme and the results to be achieved.

The full-time and part-time study courses of the study programme 'Wood Processing' are designed so that first, the general, theoretical study courses are acquired, and then the theoretical and professional specialisation study courses of the industry. Such organisation of the study programme ensures the sequential acquisition of the necessary knowledge and skills to prepare competent specialists who manage, produce, and control the direct processes of wood pre-processing and further processing.

When preparing the study plan for full-time and part-time studies (Annex WOOD PROCESSING_study plan), the principle of course succession has been observed. The course curriculum is taken as the basis, as well as an evaluation of what knowledge is needed for the student to be able to fully acquire it during the study process. For example, the study course 'Wood Studies' provides basic knowledge for recognising tree species, physical and mechanical properties, as well as introduces the structure and components of wood. Therefore, this knowledge is necessary for the student to further master the 'Forest Commodity Science', where the emphasis is on round timber, which in turn is necessary during the first 'Practical Training in Wood Processing' internship. Similar principles of succession have been observed in other study courses.

To avoid duplication of the study course curricula in the theoretical and professional courses of the field, as well as in practice, a regular audit has been performed – the lecturer of the course or practice introduces the course curricula to all lecturers. To ensure the process, a specific course is opened, where the lecturer briefly presents each topic and the related practical work. In addition, the director of the study programme evaluates the duplication of the course curricula by performing mapping (Annex Wood_Processing_mapping). To comply with the professional standard, course mapping (Annex Wood_Processing_mapping) has been created, which shows the mutual linkage with the study courses and the topics reflected in them.

To ensure the study process, additional support tools are used for the better acquisition of the subject, or for online communication with the course lecturer such as the E-study system, in which information regarding the study literature is regularly supplemented, as well as other activities – communication, forum, etc. At the commencement of study courses at the beginning of each study course, students are introduced to the amount of work to be performed during the term, as well as to the assessment system.

**FULL TIME**

**1st academic year**

In the 1st academic year, Wood Processing engineers not only take theoretical courses in the field such as Metrology and Standardisation (MatZ1004), Construction Materials (LauZ2023), Machine Elements (MašZ2007) and Technical Graphics I (MašZ4013), but also professional courses such as Wood Science (MatZ2036), Wood Cutting Processes (MatZ2035), Wood Processing Machinery and Tools (MatZ3028), Design Basics of Wood Articles (MatZ1002), and Wood Commodities Science (MatZ3018), which provide basic knowledge of the wood processing industry. During this time, internships are also planned: Practical Training in Wood Processing (MatZP013) and Wood Processing Machinery and Tools (MatZP006).

**2nd academic year**

In the second academic year, the acquisition of knowledge in the theoretical and professional specialisation courses of the field continues, improving the basic knowledge in the field of wood processing. The most important study courses are Hydraulics and Pneumatics (MašZ4049), Applied Mechanics (Meha4014), study course on computer-controlled equipment or CNC  Wood Processing MatZ2037, Modelling of Wood Processing (MatZ3029) and Production of Sawn Timber (MatZ3057). During this time, individual study papers in study courses Wood Processing Machineries and Tools (MatZ3017) and Modelling of Wood Processing (MatZ3026) are also planned.

**3rd academic year**

In the third academic year, in-depth attention is paid to the acquisition of knowledge regarding various wood processing processes. The new wood processing engineers will have to study the study courses: Hydrothermical Processing of Wood (MatZ3060), Production of Glued Materials

(MatZ3061), Wooden Building Structures (MatZ3024), Manufacturing of Wood Products (MatZ3059), Finishing of Wood Materials (MatZ3031) and Chemical Technologies of Wood (MatZ3058). After the theoretical study courses to be acquired, study works shall be developed, e.g., for the Hydrothermal Processing of Wood (MatZ3012).

**4th academic year**

In the last academic year, the focus is on the development of individual works of various nature in connection with the Diploma Thesis, as well as knowledge of the practical significance of commercial activities in the wood processing industry is acquired. Young wood processing engineers develop individual study papers on Production of Plywood and Wood Based Panels (MatZ3027), Finishing of Wood Materials (MatZ4013), Planning of Wood Processing Enterprises (MatZ3065), Manufacturing of Wood Products (MatZ4004), as well as they will develop a business plan in the study course Entrepreneurship in Timber Industry (MatZ4022). At the end of the studies, a diploma thesis shall be developed on the improvement of the technological process in the company or the introduction of new products into production or experimental research. Upon graduation from the study programme 'Wood Processing', a professional bachelor's degree in materials engineering and the qualification of a wood processing engineer is awarded.

**PART TIME**

The studies are organised over five years. The Diploma Thesis is developed in the 5th academic year, when the student demonstrates the knowledge and professional skills acquired during the entire study period, which are related to wood processing production.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

In the professional bachelor's study programme 'Wood Processing', the student, who has obtained a positive grade in the overall acquisition of the programme curriculum, receives a diploma. Has successfully mastered study courses (including free choice courses), internships, as well as successfully defended the final thesis. In the curricula of the study courses of the study programme 'Wood processing', the topics of lectures, practical and laboratory works are included, as well as the indicated forms and procedures of knowledge testing. Study results are evaluated according to two indicators: qualitative (10-point scale) and quantitative – credit points (CP). The value of one credit point corresponds to 40 hours of one week of study work (classroom classes or contact hours – 16 hours and independent or individual work – 24 hours). The results of the student knowledge test are evaluated with a mark on a 10-point scale (exam, test with a mark)) or without a mark (passed, failed). A score of 4 (almost average) is the lowest successful mark. The lowest positive grade in the final viva is 5 (average). The knowledge of students who exceed the amount of knowledge included in the specific study course programme is assessed with the highest mark – 10. Exams are taken by the leading lecturer. Exams can be written, oral, test-type or combined. The study programme ends with a final examination – Diploma Thesis (MatZ4011), which is large-scale research or technological content work, containing situation analysis, materials and methods, sections of results and analysis.

The duration of the term corresponds to the number of credit points to be acquired or to the length of the term, which is provided in the amount of 20 weeks or 20 CP. During the term, the student acquires the specified study courses in accordance with the study plan. The overall structure of the study process is designed sequentially in order for the appropriate knowledge skills and competencies to be acquired.

At the beginning of the lecture, the course lecturer (in some cases lecturers) outlines the course objectives, tasks and expected results by explaining the requirements for successful completion of the course and examinations, explains the assessment criteria in detail and informs students about consultation times and their form. Almost 90% of the study courses have an exam or test as a final examination (LLU Study Regulations). During the studies, students improve and strengthen the acquired knowledge by participating in seminars, presenting papers, reports, as well as forming active discussions. Within the course, current events in the industry are mainly mentioned as examples.

In the development process, to provide up-to-date information as well as to provide students with more complete insight into the industry's demand for knowledgeable professionals, individual lectures or courses are led by the industry professionals, thus gaining students' interest in the process. The possibility of receiving an accumulative assessment can also be assessed as a positive factor, which clearly motivates students.

Table 2.3.1

**Attracting guest lecturers in the study programme Wood Processing**

| No. | Academic year | Represented organisation, etc. | Study course to be taught |
|---|---|---|---|
| 1. | **2014/2015** | *Mitek Baltic Ltd., Rothoblaas Baltic Ltd., Wurtz Ltd, Kosters Ltd.* | Wooden Building Structures (MatZ3024) |
| 2. | **2015/2016** | *Mitek Baltic Ltd., Rothoblaas Baltic Ltd., Wurtz Ltd, Kosters Ltd.* | Wooden Building Structures (MatZ3024) |
| 3. | **2016/2017** | *RothoBlaas Baltic Ltd., Wurth Ltd., Kosters Ltd. SIMPSON Strong_Tie Sp. Z o.o, Ottensten Latvia Ltd., Jeld Wen Latvija Ltd.*, Latvian State Institute of Wood Chemistry. | Wooden Building Structures (MatZ3024); Introduction in to Studies (MatZ1005); Entrepreneurship in Timber Industry (MatZ4014) |
| 4. | **2017/2018** | *JeldWen Latvia Ltd., OAK Ltd.; Nakts mēbeles Ltd., Kosters Ltd., SIMPSON Strong-Tie Sp. Z o.o.*, Latvian Association of Independent Timber Harvesting, Association *Zaļās Mājas*, Latvian Forest Owners' Association, *Flora Ltd*. | Wooden Building Structures (MatZ3024); Introduction into Studies (MatZ1005); Entrepreneurship in Timber Industry (MatZ4014) |

| | | | |
|---|---|---|---|
| 5. | **2018/2019** | *JeldWen Latvia Ltd., Latvijas Finieris JSC, Flora Ltd., OAK Ltd.; Nakts mēbeles Ltd.*, Association *Zaļās Mājas*, Latvian Forest Industry Federation.<br>Latvian Forest Owners Association, Latvian Association of Independent Timber Harvesting.<br>***Foreign guest lecture***: *Kauno Kolegija* (Kaunas College) guest lectures for students of the study programme 'Wood Processing'. | Introduction into Studies (MatZ1005); Entrepreneurship in Timber Industry (MatZ4014) |
| 6. | **2019/2020** | *Latvijas Finieris JSC*, *Nakts mēbeles Ltd.*, Association *Zaļās Mājas*, Latvian Forest Industry Federation, Latvian Forest Owners' Association, Latvian Association of Independent Timber Harvesting Companies (LAITHC), SIMPSON Strong-Tie *Sp. Z o.o.*, *Rothoblaas Baltic Ltd., Mitek Baltic Ltd.*. | Wooden Building Structures (MatZ3024); Introduction into Studies (MatZ1005); Entrepreneurship in Timber Industry (MatZ4014) |

During the accreditation period, the teaching methods have changed – the work with students is more group work, e-learning is used, distance learning opportunities are offered, the involved lecturers learn the latest pedagogy and teaching methods – media literacy, they have started active and extensive practice in companies to create a study process more relevant to the modern requirements (competence-based study process).

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

Regulation No. 512 of the Cabinet of Ministers of the Republic of Latvia (Regulations on the State Standard of the Second Level Professional Higher Education) stipulates that internships are necessary for professional higher education programmes. In the study programme 'Wood Processing' (full-time and part-time) practical training is an integral and mandatory part of the study process. Students of the study programme have 6 traineeships and one production internship for two months. The tasks of traineeship are related to the in-depth acquisition or strengthening of theoretical knowledge. They are:

- Practical Training in Wood Processing (MatZP013, 2 CP) – traineeship, during which the students get acquainted with and improve their skills in different types of wood processing;
- Wood Processing Machinery and Tools (MatZP006, 2 CP) – traineeship, during which skills and competencies regarding different equipment in different woodworking processes are strengthened, incl. visiting companies in the industry;
- Production of Sawn Timber (MatZP010, 2CP) – traineeship, during which students are

provided with practical classes in sawn timber production and the practical assessment of these processes in the production companies;

- Hydrothermal Processing of Wood (MatZP008, 2 CP) – internships, getting acquainted with the drying processes in enterprises and strengthening skills regarding hydrothermal treatment processes;
- Production of Glued Materials (MatZP007, 2 CP) – a traineeship, where students, by strengthening knowledge, get acquainted with and improve their skills and competencies regarding various production processes of laminated materials, performing practical tasks in the laboratory of the Department of Wood Processing and visiting relevant companies;
- Manufacturing of Wood Products (MatZP009, 2 CP) – internship, during which a student shall develop a finished wooden product and shall explain its production process;
- Business in Sector (MatZP037, 8 CP) – a two-month production internship, during which students go to one of the companies in the industry based on an internship agreement; the internship takes place in accordance with the study course guidelines of the Department of Wood Processing of the LLU Forest Faculty.

Internships are organised in such a way that students first master the theory that is essential for acquiring the respective traineeship. For a detailed distribution of internships in the study programme, see the study plan (Annex WOOD_Processing_plan). In turn, the production internship is planned for the last study year (both full-time and part-time) for students, when they have acquired all the intended knowledge and skills.

There is close cooperation between the Forest Faculty and companies in the timber industry in providing internships. An insight into the internships in companies chosen by the students can be found in Table 2.4.1.

Table 2.4.1

**Student internships, breakdown**

| No. | Year | Internships (companies) |
|---|---|---|
| 1. | **2014** | *Brāļi Baloži Fu, Saldus mežrūpniecība JSC* (choice of 2 students), *Ingrid D* JSC (choice of 2 students), *Kureks* Ltd., *KVIST* Ltd., *BSW Latvia* Ltd., *Latvijas Finieris JSC* (choice of 3 students), *MASTERWORK FURNITURE* Ltd., *IKEA Industry Latvia Ltd, ŠNEPSTU JAUNĀRES Fu, Baltic Block* Ltd., *Magrens* Ltd. and Forest and *Wood Products Research and Development Institute* (choice of 7 students). |
| 2. | **2015** | *Brāļi Baloži Fu, Saldus mežrūpniecība JSC* (choice of 2 students), *Ingrid D* JSC (choice of 2 students), *Kureks* Ltd., *KVIST* Ltd., *BSW Latvia* Ltd., *Latvijas Finieris JSC* (choice of 3 students), *MASTERWORK FURNITURE* Ltd., *IKEA Industry Latvia Ltd, ŠNEPSTU JAUNĀRES Fu, Baltic Block* Ltd., *Magrens* Ltd. and *Forest and Wood Products Research and Development Institute* (choice of 7 students). |
| 3. | **2016** | *Krēzs pluss* Ltd., *Avoti SWF* Ltd., *LAZURJ* Ltd., *Piebalgas* Ltd., *DLLA* Ltd., *AKZ* Ltd., *Latvāņi* Ltd., *Avangart* Ltd., *Jēkabpils Mežrūpniecība Ltd, Ošukalns* Ltd., *Stora Enso Latvia JSC, SC KOKS* Ltd., *Latvijas Finieris JSC* and *Forest and Wood Products Research and Development Institute* Ltd. (choice of 8 students). |

| | | |
|---|---|---|
| 4. | **2017** | *Jeld-Wen Latvija* Ltd., *Avoti SWF* Ltd., *Daiļrade Koks* Ltd. (choice of 2 students), *Wood ART.LV* Ltd., *URBIX 2* Ltd., *IKTK* Ltd., *Līva AB Nord* Ltd., *AMBE PARKETT GmbH, VARPA* Ltd., *TKF Latekss* Ltd., *Latvijas Finieris JSC* (choice of 5 students) and *Forest and Wood Products Research and Development Institute* Ltd. (choice of 3 students). |
| 5. | **2018** | *Laimes darbnīca IC, BS-Holz* Ltd., *HUSVIK* Ltd., *Cross Timber Systems* Ltd., *4Plus* Ltd., *SC Koks* Ltd., *ZUSA* Ltd., *Latvijas Finieris JSC, Byko-Lat* Ltd. (choice of 2 students) and Forest and Wood Products Research and Development Institute Ltd. (choice of 13 students). |
| 6. | **2019** | *IMU* Ltd., *AV WOOD DESIGN* Ltd., *Edorja* Ltd. and *Forest and Wood Products Research and Development Institute* Ltd. (choice of 6 students). |
| 7. | **2020** | MD Noass Ltd., Marks M Ltd. (choice of 2 students), *Amatnieks REM* Ltd., *Ošukalns* Ltd., *Amber Wood* Ltd., *Jeld-Wen Latvija* Ltd., *IKTK* Ltd., *Latvijas Finieris JSC, Riga Veneer* and *Forest and Wood Products Research and Development Institute* Ltd. (choice of 8 students). |

During the implementation of the study course, the lecturers of the study course regularly control the students' knowledge and skills, by using the types of examinations indicated in the curricula of the study course – tests, colloquium, reports, homework, etc. Internship defence is public, with the participation of students and the faculty, which helps students to perceive the internship as a potential place of employment.

Internships are graded with pass/fail. A student acquires an internship programme, working in an internship company for a certain period – 8 weeks or 2 months. During this time, the student prepares an internship report by submitting it to the internship supervisor. The internship supervisor organises a public defence of the internship, inviting lecturers of study courses, directors of study programmes, etc. The procedure for the implementation of the internship at LLU is determined by the Internship Regulations of Latvia University of Life Sciences and Technologies (Decision No. 8-130 of the Senate of Latvia University of Life Sciences and Technologies of 12 November 2014). At the end of each individual internship, the director of the study programme together with the course senior discusses the impressions gained during the internship and specifies the shortcomings to be eliminated (if any).

### 2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.

The topics of the final - Diploma Thesis (DT) of the professional bachelor's study programme ‘Wood Processing’ in full-time studies are chosen in the first term of the 4th year (7th term), but in part-time studies, in the second term of the 4th year (8th term). The current practice envisages that the student has the right to choose an interesting, desired topic and supervisor. The study programme ends with a developed, reviewed, and defended Diploma Thesis. The Diploma Thesis is independent research with elements of scientific work, in which the undergraduate, based on the theoretical knowledge and practical skills acquired during the studies, carries out original research and

develops specific solutions to the research problem. Students select and develop/make improvements in production technology, incl. in real companies, which need to perform calculations of raw materials, consumables, and fittings, select appropriate equipment and technological lines, prepare product drawings, production technological schemes and production plans of the plant, and finally analyse the market demand of the manufactured product. Students can also conduct practical research to prepare a prototype of a product or equipment, paying attention to potential demand. Students shall develop the DT in accordance with the methodological instructions developed by LLU Forest Faculty (hereinafter – FF) - http://www.mf.llu.lv/sites/mf/files/files/lapas/SND.PDF (*in Latvian*).

After the students have chosen the topics (approximately) and the supervisor (s), their topicality is discussed at an open meeting of the Department of Wood Processing, where the potential supervisor is invited to substantiate the topicality and significance of the topic for the forest industry. After reviewing and clarifying the topics, students commence the work on the paper in cooperation with the supervisors. The supervisor is responsible for the quality of the work and the compliance of the content with the basic information and methodological rules. DTs are topical for the wood processing industry and their quality is enhanced, which is positively assessed by the State Examination Commission (SEC) (Article 58 of the Law on Higher Education Institutions). In addition, it should be considered that part of the developed Diploma Thesis is implemented in one of the projects (applied research, grants, cooperation projects, European Union support projects), including with partners such as *Forest and Wood Products Research and Development Institute* Ltd. and *Latvijas Finieris* JSC.

About 2/3 of all developed DTs are production projects in various enterprises of timber industry. They are related to the introduction of new products into production, which means that work shall be done on the selection of the necessary equipment and production facilities and improvement of production technological processes; if it is necessary, students evaluate the efficiency and economic benefits of existing and potentially new technological elements from both the financial and technical point of view.

Students' DTs are developed in different directions: wood materials and technologies, industrial design in wood processing, marketing and logistics in the timber industry. A small insight into the topics of the selected works can be found in Table 2.5.1.

Table 2.5.1

**The most recognised and highly rated Diploma Thesis topics by the SEC**

| No. | Year | Topics of the Diploma Thesis |
|---|---|---|

| | | |
|---|---|---|
| 1. | **2014** | · ‘Improvement of Fire Safety of Exterior Finishing Boards with Flame Retardants and Finishing Materials’;<br>· ‘Cottage Made of Small Merchantable Wood’;<br>· ‘Project of the Children’s Wooden Construction Plant’<br>· ‘Pre-Processing Opportunities of Birch Veneer Logs in the Regions of Latvia’;<br>· ‘Factors Influencing the Adhesive Strength of the Plywood’;<br>· ‘Use of Inorganic Silicon Compounds to Reduce Wood Flammability’; |
| 2. | **2015** | · ‘Use of Synthetic Fibres in Furniture Joints’;<br>· ‘Economic Justification for the Establishment of a Production Unit for Wall Decorative Panels’;<br>· ‘Improvement of the Production Productivity of Laminated Pine Solid Wooden Board in *IKEA Industry Latvia* Ltd’;<br>· ‘Investigation of Factors Influencing the Bond Strength of Plywood Laminated with Modified Melamine–Carbamide–Formaldehyde Resin at the *Furniers* Plant’;<br>· ‘Improvement of Drying Quality in Continuous Sawn Timber Drying Equipment of *Saldus Mežrūpniecība* JSC’;<br>· ‘Development of Constructive Solutions for Panel System of Building Facade Insulation’; |
| 3. | **2016** | · ‘Development of Black Oak Wood Drying Technologies’;<br>· ‘Selection of Cutting Tools for with a High-Pressure Laminate Coated Plywood Parts for MACHINING with Program-Controlled Milling Machines’;<br>· ‘Kurzeme Regional Reverence Training Centre Project for the Manufacture and Reconstruction of Wooden Products’;<br>· ‘Introduction of Appearance Sorting of Sawn Timber in *Cross Timber Systems’;*<br>· ‘Improvement of the Production Process in *Avangard* Ltd.;<br>· ‘Research of Technological Process in *SC KOKS*’; |

| | | |
|---|---|---|
| 4. | **2017** | · 'Design Project of Computer Numerical Control Equipment';<br>· 'Improvement of Plywood Drying Technological Processes in *Verems*' *RSEZ Ltd.*;<br>· 'Comparison of Methods for Determining the Physical-Mechanical Properties of Birch Plywood'; |
| 5. | **2018** | · 'Renovation of Laminated Wood Beam Production Technology in *BS-HOLZ Ltd.*';<br>· 'Possibilities of Creating a Wooden Pallet Nailing Line in *ZUSA Ltd.*';<br>· 'Development of Joints for Mesh Domes';<br>· 'Fire Door Production Project at *FLORA Ltd.*';<br>· 'Improvement of the Efficiency of Veneer Drying Equipment and Increase of Production Capacity';<br>· 'Project of a Bee Hive Production Enterprise';<br>· 'Research of Non-Standard Laminated Timber Production Technology'; |
| 6. | **2019** | · 'Techniques for Artificial Ageing of Wood Surfaces';<br>· 'Diversification Options of Product Manufacture in *AV WOOD Design*'; |
| 7. | **2020** | · 'Introduction of Baked Wood Production in *PAVASARS HOUSING CONSTRUCTION Ltd.*';<br>· 'Improvement of Thermally Modified Wood Products Manufacturing Technology in *Ošukalns Ltd.*';<br>· 'High Pressure Impregnation Technologies for Wood Fire Protection';<br>· 'Development of Decorative Wooden Column With Hollow Middle Technology';<br>· 'Introduction of a Balance Board in Production in *MD Noass*';<br>· 'Reconstruction project of the packing station at the factory *Hapaks* of *Latvijas Finieris JSC*'. |

All DTs are defended in the SEC. The viva is divided into a 10 min presentation of the developed Diploma Thesis, and up to 10 min is the estimated time for questions. Initially, questions are asked by the members of the SEC and then by other interested parties. The regulations for the establishment of the SEC, for the pre-viva, evaluation and award of the degree are regulated by the Regulations of Latvia University of Life Sciences and Technologies on the Final Examinations of Undergraduate Studies (9 April 2014, Decision No. 8-65 of the Senate of Latvia University of Life Sciences and Technology). By the order of the Rector of Latvia University of Life Sciences and Technologies, the SEC is established, including professionals of the wood processing industry and

specialists of controlling institutions. The composition of the SEC, as well as the results of the Diploma Thesis, are discussed at the FF Council meeting.

For the purposes of evaluating the DT for the professional bachelor's study programme 'Wood Processing', the SEC is established, which consists of 7 members, 4 of whom are representatives of the industry (~ 60%). Representatives of the industry from the following companies have been delegated as members of the SEC – Latvian Association of Wood Processing Entrepreneurs and Exporters, *Latvijas Finieris JSC*, Association *Latvijas Mēbeles* and *PATA Saldus JSC*. The other members of the SEC are delegated representatives of the Department of Wood Processing. The reviewers of DTs are industry specialists (production managers, technologists, quality managers, etc.) and lecturers of the Department of Wood Processing. For the Dts developed in the companies, the reviewers from the companies are appointed to obtain an assessment of how the work performed corresponds to the assessment of the company. In recent years, the practice of DTs reviewers being from the wood processing industry has been very important. This Diploma Thesis is voluntary and the great interest from the industry indicates the high quality and practical application of the thesis.

All Diploma Thesis (full-time and part-time studies) submitted to the State Examination Commission and developed by students have been successfully defended. Until now, there have been no cases when any DT submitted by student was recognised as inappropriate. The commission awarded all authors of successfully defended thesis a professional bachelor's degree in materials engineering and awarded the qualification of a wood processing engineer. In the evaluation of the Diploma Thesis, the members of the SEC evaluate using a 10-point scale.

Table 2.5.2 summarises information on the assessment of students' DTs in different academic years. The collected data show that the thesis developed by the students in the study programme are defended with good and very good results. In recent years, the average grade at the viva has fluctuated between 7 and 8 (see Table 2.5.2). The State Examination Commission welcomes the fact that the current, mostly binding, practical, specific issues relevant to the companies have been addressed in the thesis.

Table 2.5.2

**Evaluations of students' Diploma Thesis in the study programme 'Wood Processing' expressed in percentage during the period 2014-2020**

| | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grade** | **Number of grades** | **%** | **Number of grades** | **%** | **Number of grades** | **%** | **Number of grades** | **%** | **Number of grades** | **%** | **Number of grades** | **%** | **Number of grades** | **%** |
| 9 – excellent | 4 | 17 | 1 | 4 | 2 | 8 | 3 | 20 | 2 | 8 | 1 | 14 | 6 | 32 |
| 8 – very good | 8 | 35 | 12 | 50 | 16 | 64 | 8 | 53 | 12 | 46 | 4 | 58 | 7 | 36 |
| 7 – good | 10 | 44 | 11 | 46 | 6 | 24 | 4 | 27 | 10 | 38 | 1 | 14 | 6 | 32 |
| 6 – almost good | 1 | 4 | - | - | 1 | 4 | - | - | 2 | 8 | 1 | 14 | - | - |
| **Total:** | **23 (-)** | **100** | **24 (-)** | **100** | **25** | **100** | **15** | **100** | **26** | **100** | **7** | **100** | **19** | **100** |
| **Average grade** | **7.7** | | **7.6** | | **7.8** | | **7.9** | | **7.5** | | **7.7** | | **8.0** | |

**2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.**

In general, the Council of Advisors of the Forest Faculty and graduates who see in practice what additional knowledge/skills are needed, play an important role in the improvement of the study process. Several co-operation agreements have been concluded between the leading Latvian forest industry companies and the Department of Wood Processing of the Forest Faculty of LLU on participation in the development and improvement of educational programmes, conducting research and scientific activities; organisation of internships and provision of internships. By concluding these cooperation agreements with LLU, the companies of the industry considered that LLU and its Forest Faculty provide the forest industry with highly qualified specialists, implementing appropriate higher professional and academic higher education, and doctoral study programmes, as well as use their scientific potential to solve significant problems. The objective of the Latvian Forest Industry Federation (*LKF*) and *Latvijas valsts meži* JSC (Latvian State Forests) (*LVM*) in developing the competitiveness of the Latvian Forest Complex is to promote and support the balanced development of LLU, making it an active, vital, and modern education and research centre with appropriate methodological and technical support, preserving the academic character and traditions. The basis of the agreements is to promote the integration of science and production, implementation of research results, development of wood processing and a product quality compliance system, improvement of education of qualified employees and knowledge-based industry development, while LLU is interested in improving scientific potential and the quality of study programmes, to contribute to increasing the competitiveness of the forest industry with its scientific and technical potential. Cooperation agreements have been concluded with *Latvijas Finieris JSC*, *Bolderāja Ltd.* (*KRONOSPAN* Riga Ltd.), *MiTek Baltic* Ltd. etc.

In the implementation of the study process, the opinion of the graduates about the provision of the study process, the acquired knowledge, skills, and competencies in studies, is of great importance. Graduates were asked to evaluate the study process on a 10-point scale. 70% of graduates have evaluated the study process with 7 to 10 points. Their evaluation of the study process in the study programme ‘Wood Processing’ can be assessed as high. Almost 79% of graduates have noted that lecturers are professional and qualified. Graduates were also asked, which knowledge they lack most in their professional field today from that which could have been provided. In fact, the thoughts of the graduates on this issue resonate with the students' opinion about the study courses that should be improved.

Therefore, the next question asked to them was, which courses would the graduates recommend improving? Here the thoughts of the graduates differed radically; some believed that the teaching of the courses was good; the main thing is that the student is motivated and interested in learning the appropriate course. However, many graduates indicated that there are courses where the teaching quality needs to be improved. Comparing the answers of the graduates with the evaluation of the students, when asking similar questions, there are no significant differences in the answers. In their answers, the graduates indicate that there are no basic objections to the study course; they want to see the teaching of the course corresponding to today's conditions and the interest of students, considering, and using the technologies available today. Therefore, every year, the Department of Wood Processing replenishes the material and technical base, prepares new teaching aids in Latvian, and improves the infrastructure, demonstrating practical examples of the use and diversification of wood in products.

Graduates were asked the following questions, namely, how do they assess their knowledge in the courses related to the profession (in points from 1 to 10) and how do they assess the compliance of the study process with the qualification to be awarded? Graduates assessed their knowledge in very different ways in the special courses, which are on a scale of 6 to 9, i.e., from almost good to excellent. 44% of graduates consider their knowledge to be very good. Graduates also believe that there are too few special courses and too many general education courses in the study plan. However, it should be noted that graduates and students associate mathematics, chemistry, and physics with general education courses and not with theoretical courses of the industry. In general, graduates evaluate their knowledge as high and sufficient.

Graduates were also asked what they most lacked when starting their careers. They replied that foreign language knowledge and practical experience, confidence in the knowledge of special courses, courage, communication, and personnel management skills. We wanted to find out, if there are any real problems with finding a job in the industry. Almost 85% of respondents answered that there are no problems.

By filling in the annual questionnaire 'Evaluation of the Lecturer', study courses are evaluated by students. The lecturer is evaluated according to several criteria: knowledge of the study course, introduction of students to the study programme and their requirements, establishment and maintaining of good contact with students, objective evaluation, well-thought-out structure and scope, good orator skills, etc. The survey is conducted by an independent LLU Sociological Research Group using the LLU information system LLU IS. At present, although a comprehensive system of lecturer evaluation has not been established, the dean of the faculty, the head of the department, the head of the programme and the lecturers themselves get acquainted with the results of the survey. The results of the survey are considered when the lecturer participates in the election to academic positions, as well as are evaluated when determining the need to improve the study course.

**2018/2019 academic year**

The opinions expressed in the international experts' evaluation in the field of study, which was carried out in 2013, have been considered, and improvements have been made in the field of study within the available financial resources.

In the study programme 'Wood Processing', expertise was performed under the leadership of a representative of the *LKF*, by expressing the opinion of the gathered employers. At the same time, until the end of November this year, this subfield of studies will be examined by an expert attracted by Tartu University of Life Sciences (EMU). Consequently, the implementation of expert recommendations, within the available financial resources, will commence in the 2019/2020 academic year.

Evaluating the curricula of study programme 'Wood Processing', the *LKF* representative concluded that the study programme is unique in Latvia. This obliges the university to keep the curricula of this programme up to date. Therefore, an expert had recommended during the academic year of 2019/2020 to create an action group consisting of industry experts, teachers of study courses in specialised and related fields of the industry and to review the curricula of study courses identified during the students' survey as less related to the technologies and processes in the wood processing industry and to make changes. The expert recommended reviewing the internal procedures of LLU regarding the minimum number of students for one free choice course, as well as to review the number of study courses available for free choice, only keeping those that are applicable to the study programme and its specialisation.

In the expert assessment, the *LKF* representative suggested delegating a wider range of

interrelated study course topics to the involved guest lecturers. When cooperating with the teaching personnel responsible for the study course, the guest lecturer should not only be co-responsible for the established lecture structure and its inclusion in the thematic plan of the study course, but also for the methodological techniques used to provide feedback and strengthen the acquired study material. The lecturers involved in the study process are involved in the implementation of various training programmes in the field, which promotes the development of the field and connection with the companies of the field.

Starting from the 2018/2019 academic year, in the implementation and improvement of the study process, more and more managers of their field are involved - experts from the Latvian Forest Industry Federation with its associations: Latvian Association of Wood Processing Entrepreneurs and Exporters, Association *Latvijas Koks*, Latvian Association of Timber Producers and Traders, Association *Latvijas Mēbeles*, Latvian Wood Construction Cluster. The study direction supporting the industry can be further developed by updating the study environment and preparing specialists in their field with qualifications, skills and competencies corresponding to the requirements of the industry.

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

Students of the study programme 'Wood Processing' can use Erasmus+ programmes and these programmes are coordinated by the LLU International Cooperation Centre. The Erasmus+ programme stipulates that students can go on study mobility to 12 countries with which LLU has concluded bilateral cooperation agreements, at any stage of their studies. In the period from 2014-2020, 31 students went to different universities. Within the study process, ERASMUS+ cooperation agreements have been concluded with several foreign universities, such as the *École Supérieure du Bois (France), Mendel University in Brno* (*Czech Republic)*, *Transylvania University (Romania), etc.,* and students used this opportunity to study abroad very actively, even during the pandemic. Foreign students, mainly from the *École Supérieure du Bois (France),* an average of 3 students annually, choose to study a term at the programme. Students have mainly gone to *Aristotle University of Thessaloniki* (Greece, 35%), *Ecole Superieure du Bois Nantes* (France, 32%) and *Mendel University in Brno* (Czech Republic, 16%). The students mainly chose to go on study mobility during different terms, i.e., from the 5th term to the 7th term, and most of them are 3rd and 4th year students. About 10% of students choose to study for another term at another foreign partner university. Before going on study mobility, the study courses that will be acquired at the exchange university are coordinated so that they can be equated with those acquired in the tudy programme 'Wood Processing' in the specific term. If the students have fulfilled all the requirements, then the previously agreed subjects are equated. So far, experience shows that it is possible to equate 100% of the acquired course.

Table 2.7.1

**Student mobility in the study programme 'Wood Processing' during the period 2014-2020**

| No. | Year | Number of students | Country | University |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1. | 2013/2014 | 2 | Finland | University of Eastern Finland |
| | | 2 | France | *Ecole Superieure du Bois Nantes* |
| 2. | 2014/2015 | 3 | France | *Ecole Superieure du Bois Nantes* |
| | | 5 | Greece | Aristotle University of Thessaloniki |
| 3. | 2015/2016 | 3 | France | *Ecole Superieure du Bois Nantes* |
| 4. | 2016/2017 | 2 | France | *Ecole Superieure du Bois Nantes* |
| | | 2 | Greece | Aristotle University of Thessaloniki |
| | | 2 | Czech Republic | Mendel University in Brno |
| 5. | 2017/2018 | 1 | Greece | Aristotle University of Thessaloniki |
| | | 1 | Romania | Transylvania University of Brasov |
| 6. | 2018/2019 | 3 | Greece | Aristotle University of Thessaloniki |
| | | 1 | Czech Republic | Mendel University in Brno |
| | | 1 | Slovakia | Technical University of Zvolen |
| 7. | 2019/2020 | 1 | Romania | Transylvania University of Brasov |
| | | 2 | Czech Republic | Mendel University in Brno |
| IN TOTAL: | | 31 (students) | | |

Until now, the students of the study programme 'Wood Processing' have not taken up the opportunity to go on study mobility internships to any of the 12 countries with which the LLU has concluded a cooperation agreement. The main reason for why this opportunity is not exercised is related to the fact that internships and international business experience in the timber industry can also be acquired in Latvia. There are several international level production companies in Latvia, such as *Kronospan Latvia Ltd., Stora Enso Latvia JSC, Jeld-Wen Latvija Ltd., Byko-Lat Ltd., Latvijas Finieris JSC*, etc.

During the reporting period, foreign students from France, Italy, the Czech Republic, Germany, etc. have studied at the Department of Wood Processing (Table 2.7.2).

Table 2.7.2.

**Incoming international student's 2013-2020**

| No | Study year | Number of students | Country | Higher education institution / university |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1. | 2012./2013. | 1 | Spain | Universitat Politecnica de Valencia |
| 2. | 2014./2015. | 2 | France | Ecole Superieure du Bois |
| | | 1 | Spain | Universitat Politecnica de Valencia |
| 3. | 2016./2017. | 5 | France | Ecole Superieure du Bois Nantes |
| | | 1 | Italy | Universita degli Studi di Bari Aldo Moro |
| | | 2 | Czech Republic | Mendel University in Brno |
| | | 1 | Germany | Rosenheim University of Applied Sciences |
| 4. | 2017./2018. | 1 | Greece | Eastern Macedonia & Thrace Institute of Technology |
| | | 2 | Italy | Università degli Studi della Tuscia |
| 5. | 2018./2019. | 1 | Portugal | Universidad de Lisboa |
| 6. | 2019./2020. | 2 | Czech Republic | Mendel University in Brno |
| IN TOTAL: | | 19 (students) | | |

During the reporting period, the number of foreign students has been stable, which shows that the interest in studies at the Department of Wood Processing is unchanged, only the partner universities are changing. It also opens up more study opportunities for our students. Until now, students have worked with the lecturers of the Department of Wood Processing in the acquisition of theoretical courses, which means that they have to work on the process of acquiring practice. It is possible that the construction of the new infrastructure - an interdisciplinary laboratory within the project “Strengthening the research, development infrastructure and institutional capacity of LLU and the scientific institutions under its supervision”, No. 1.1.1.4./17/I/003, will allow it to be implemented.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the**

**information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MoES), the Ministry of Agriculture (MoA) and Latvia University of Life Sciences and Technologies (LLU). The tripartite agreement on funding for 2020 stipulates that the basic cost of one study place is EUR 1,518.98, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the bachelor's programme 'Wood Processing' is 1.8 (coefficients for each thematic area of education are different, and they are stipulated in the Cabinet Regulation of the Republic of Latvia 'Procedures for financing higher education institutions and colleges from the state budget'); the costs per student in the bachelor's programme 'Wood Processing' are EUR 2,898.03.

Every year, the LLU Senate approves the distribution of revenues and expenses of the LLU general budget structure, prepared in accordance with the Saeima annual Law on the State Budget and the annual LLU Rector's Order "On LLU General Budget Planning". The control and audit of the general budget is performed by an independent sworn auditor, whose opinion and report are reviewed and approved by the Senate of LLU.

Before approving the distribution of LLU general budget revenue and expenses in the Senate, it is reviewed, discussed, and approved by the Working group on resource use and development, which consists of the Rector, vice-rectors, chancellor, LLU director, all deans of faculties, head of the resource accounting centre/chief accountant, head of the financial planning centre, key economists, key specialists in real estate and legal issues.

The distribution of income and expenses approved by the LLU Senate determines that 80% of the funding allocated from the state consists of compensation costs and 20% of other costs. 60% of the paid study funding consists of reimbursement costs and 40% other costs, of which 20% is directly at the disposal of the faculty that implements the respective study programme. The amount of funding for the science base is calculated and allocated annually from active research activities. The science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is to cover centralised costs. The science funding consists of funding attracted for the implementation of projects.

Tuition fee per term: full-time studies – EUR 950 and part-time studies – EUR 650.

The overall distribution of the total LLU budget is formed by the estimates of structural units/faculties, where the costs are estimated by type of expenditure.

1. annual proportion of costs of the bachelor's study programme 'Wood Processing' consists of:

- Remuneration – 73%
- Scholarships – 7%
- Goods and services – 16% incl. utilities – 6%
- Formation of share capital – 4%

**For comparison, public funding by year**

2019 The tripartite agreement on funding for **2019** stipulates that the basic cost of one study place is EUR 1,518.98, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the

education thematic area for the bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the bachelor’s programme ‘Wood Processing’ are EUR 2,897.83.

2020. The tripartite agreement on funding for **2018** stipulates that the basic cost of one study place is EUR 1,458.51, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2,788.55.

The tripartite agreement on funding for **2017** stipulates that the basic cost of one study place is EUR 1,393.33, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2,672.14.

The tripartite agreement on funding for **2016** stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2190.93.

The tripartite agreement on funding for **2015** stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2191.05.

The tripartite agreement on funding for **2014** stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2173.52.

The tripartite agreement on funding for **2013** stipulates that the basic cost of one study place is EUR 1333.36, the study level coefficient for the bachelor's programmes is 1 and the social security of a study place for bachelor's programmes is EUR 164.34; the study cost coefficient of the education thematic area for the professional bachelor's programme ‘Wood Processing’ is 1.8, the costs per student in the professional bachelor’s programme ‘Wood Processing’ are EUR 2181.55.

Realization of the practical part of the study process - laboratory and practical works, in addition to specialization part at the Department of Wood Processing, also takes place in other structural units of LLU - Forest Faculty (Akadēmijas Street 11), Technical Faculty (Čakstes Boulevard 5), Faculty of Environment and Civil Engineering(Akadēmijas ielā 19) and in the main building of the university (Lielā Street 2).

The Department of Wood Processing of the Faculty of Forestry has the equipment of a wood scientific laboratory for the evaluation of the wood physical-mechanical and physical-chemical and mechanical properties (Table 3.1.1.).

Table 3.1.1.

**Tools, machines and equipment available to students during their studies**

| Function | Equipment | Utilisation |
|---|---|---|

| | | |
|---|---|---|
| Determination of physical-mechanical features of wood | Instron KN600 equipment for determining the mechanical features of construction materials.<br>Equipment for determining the mechanical features of wood-based materials Instron 5967.<br>Wood strength meter Timbergrader MTG.<br>Wood moisture meter BROOK-BFMD6 with universal sensor and sensor for determination of chip moisture. | For large specimens with a maximum load of 600 kN, length up to 7.0 m, width 200 mm, thickness up to 400 mm, determining the features of elasticity and strength in compressing, stretching and bending; tests of mechanical properties of small samples by bending, stretching, stretching and sliding; for non-destructive testing of wood using the speed of sound movement; for determination of moisture of wood and wood materials (plywood and bulk materials) in accordance with the standards EN 13183-1; 13183-2, 13183-3. |
| Determination of physical-chemical features of wood | Cone Calorimeter. | Determination of fire reaction of wood and wood-based materials according to the ISO 5660 standard. |
| Determination of material surface features | Adhesion tester kit PosiTest<br>Scratch resistance tester ERICHSEN 413. | For the determination of the reaction to fire of wood and wood-based materials in accordance with ISO 5660; for the determination of the adhesion properties of wood finishing materials. |
| Preparation of materials | Climate camera Memmerth.<br>Water boiling equipment.<br>Air conditioning system NAUR.<br>Drying cabinets Memmerth. | Equipment for equalisation and holding the samples equilibrium moisture prior to testing; equipment for holding wood samples in water at a boiling temperature under normal conditions; equipment for the prior holding of wood samples before the performance of the tests, if the materials are intended to be used in wet conditions. |
| Analysis of construction products and emission materials | Volatile substance analysis equipment set E-WK I 1000, Wiess Technik. | Equipment for the analysis of emissions of construction products and materials for the determination of the composition and amount of volatile organic compounds in construction products and their suitability for the needs of the construction process. |

| | | |
|---|---|---|
| Grinding of hard, brittle, and fibrous materials | Sample mill Retsch RM200. | Ball mill for pulverising, homogenising, and colloidal milling of soft, hard, breakable and fibrous materials |
| Thermal inspection of buildings and structures | Thermograph Testo 882. | Determination of heat loss in buildings and structures. |
| Determination of melting point | Ash melting temperature measuring equipment Misura 3 HSMN, Expert System Solutions. | Determination of the melting point of substances up to 400 °C. |
| Determination of deformations | Deformation meter IDC-1 1242. | Determination of linear dimensional changes. |

| | | |
|---|---|---|
| Wood processing, sample preparation | Universal format ripsaw machine Altendorf F45.<br>Computer Numerical Control machine with mechanical cutting device VHF.<br>Computer Numerical Control machine with laser cutting device Trotec Speedy 400.<br>Planer-Thicknesser machine FELDER AD 951.<br>Universal milling machine MAKA SF-4500.<br>Wide belt sanding machine SCM Sandya 300.<br>Material gluing press S&S Maschinenbau GmbH VS 2000.<br>Vacuum press Istra-A VP-3000.<br>Glue application machine GST-300.<br>Edgebanding and processing equipment set FELDER G.<br>Multi-spindle drilling machine Vitap ALFA21.<br>Horizontal single shaft drilling machine HOLZMANN LBM 290.<br>Vertical band saw FELDER FB 540.<br>Horizontal band saw for sawing logs “Tehnika Auce” Ltd. ZBL-60HM.<br>Hand power tools FESTOOL.<br>Sharpening equipment for cutting tools.<br>High speed camcorder kit. | Machine tools and equipment for woodworking and sample preparation for testing. |

The execution of the study process practical work takes place also in cooperation with “Forest and Wood Products Research and Development Institute” Ltd. For the needs of the study process, the company's equipment is also available and it consists of the following items:

- glued joint test equipment set (delamination);
- accelerated material ageing climate chamber;
- fire resistance testing equipment FTT SBI;
- furniture test stand for tests of chair stability, cabinet furniture, beds, mattresses, furniture doors, drawers;
- mechatronics laboratory equipment Festo Didactic;
- biofuel shredder;
- calorimeter 6200;
- thermal camera Nabertherm;
- small flame test apparatus;
- impact strength tester ZEHNTNER ZIT;
- sawn timber drying chamber;

- pellets tester MATADOR 50HZ STD.2;
- pellets press.

The adequacy of the infrastructure can be assessed as tolerable, but not comprehensively sufficient. Improvements of buildings and laboratories have been made at the Department of Wood Processing have been established for practical work with machine tools and instruments, however, in comparison of similar study field modernisation in other Latvian higher education and even vocational education institutions, competitiveness is gradually declining.

In order to solve the shortage of laboratories and premises, in 2021, the construction of a new laboratory building was started, which was implemented in project No. 1.1.1.4./17/I/003 titled Strengthening of research, development infrastructure and institutional capacity of Latvia University of Life Sciences and Technologies and scientific institutions under its supervision.

In the premises allocated for the study process, students acquire both practical skills in wood processing, as well as perform laboratory and practical work in all study courses included in the study programme, as well as perform scientific research. The students have a computer class in the department. It is practice using the latest software within the study courses, for example, Computer-aided Design, Fundamentals of CNC (Computer Numerical Control Machines) in Woodworking, Timber Constructions, etc.

Students have the opportunity, using the e-environment and e-learning tools, to study independently and communicate with the academic staff electronically. Study materials are placed in an e-studies system created by LLU (in the Moodle environment), which is available on the website:https://estudijas.llu.lv/?lang=en. Students and lecturers have access to the library of LLU with a wide range of special literature and access to various databases https://llufb.llu.lv/en, as well as materials and scientific literature compiled by lecturers, which are in the collections of faculties, departments, institutes or lecturers. Various options are available for the search of information.

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

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

The annual changes in teaching personnel can be assessed as insignificant, which means that the changes in the number of lecturers are not large. Existing lecturers regularly improve their knowledge in various seminars and courses to expand the field of vision; in some cases, these courses are not directly related to the industry. When attracting new lecturers, it is important that when conducting lectures in a professional bachelor's programme, their activity is related to the

industry.

The number of teaching personnel involved in the study direction in the reporting period, compared to the previous period, can be seen in Table 4.1.1.

Table 4.1.1

**Number of academic staff involved in the study direction**

| ***Position*** | **2014/2015** | **2015/2016** | **2016/2017** | **2017/2018** | **2018/2019** | **2019/2020** |
|---|---|---|---|---|---|---|
| Professors | 7 | 7 | 7 | 6 | 5 | 5 |
| Associate professors | 3 | 5 | 4 | 4 | 3 | 2 |
| Assistant professors | 9 | 9 | 8 | 8 | 7 | 6 |
| Lecturers | 14 | 10 | 10 | 10 | 9 | 8 |
| Assistants | 1 | 1 | 1 | 2 | 1 | - |
| Leading researchers | 2 | 1 | 2 | 3 | 3 | 3 |
| Researchers | 3 | 2 | 2 | 2 | 1 | 1 |
| **Total** | 39 | 35 | 34 | 35 | 29 | 25 |

Less than 10% of lecturers work in the implementation of the study programme in terms of full-time equivalent (FTE), combining it with scientific work as researchers, leading researchers. Many lecturers work in addition to teaching. It can also be considered as a positive aspect, as the experience and knowledge from the industry is integrated into the study process. There are variations in the statistics starting from 2015/2016, because we started to implement a changed study plan, with an increased number of credit points for the study courses – at least 2 CP and reduced the total number of study courses in the whole programme.

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

In the implementation of the study programme, the requirements for the academic staff of the professional study programme comply with the requirements specified in Article 39 of the Law on Higher Education Institutions (https://likumi.lv/ta/en/en/id/37967-law-on-higher-education-institutions). In addition, various

activities are analysed and performed to motivate the academic staff to improve. Currently, the development of the academic staff is related to the performance of various activities, such as the preparation of textbooks and publications, participation in projects or their management. The business biography of each lecturer is attached in the study direction annexes. For example, several study courses are taught by lecturers whose research activities are related to *Meža un koksnes produktu pētniecības un attīstības institūts Ltd.*, and whose participation in projects and scientific activities are related to the curricula of the course and transfer of professional knowledge in the study process. Thus, it is possible to not only ensure the acquisition of theoretical knowledge, but also to provide students with knowledge of recent studies and their results.

Colleagues provide representation and activities in the European Cooperation in Science and Technology (COST) organisation, in the European Group of Organisations for Fire Testing, Inspection and Certification (EGOLF), in the professional association InnovaWood (an umbrella organisation that integrates four European networks in the Forest, Wood-based and Furniture industries into a more effective mechanism to support innovation in these sectors), in the Technical committee 'Timber' of the Latvian National Centre of Standardisation. Lecturers have taken qualification exams in several technical schools and educational competence centres. Cooperation with colleagues from Estonia and Lithuania has been ensured, approbating the knowledge and competencies acquired in the neighbouring countries in the improvement of the content of the Wood Processing. During the reporting period, lecturers have been very actively involved in professional development, by acquiring marketing techniques, computer skills, media skills and social skills related to the attraction of potential students.

In general, the professionalism of the teaching personnel involved in the study process can be assessed positively, which is indirectly indicated by the increase in the number of students in full-time studies, as well as the consistently high interest in part-time studies.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields**

**related to the content of the study programme), as well as the use of the obtained information in the study process.**

The proactivity of the academic staff in connection with the implementation of applied and industrial research is directly related to the transfer of knowledge to the study process, both for the improvement of theoretical knowledge and for the orientation of students into the research. It means that students are offered topical issues (one of the tasks of the project), which they can solve using the same methodology and tools. After data collection and further processing, they can compare the results and discuss deviations if necessary. Such work is carried out under the close supervision of the supervisor, which is related to both the correct orientation of students in science (demonstrating that data shall be collected carefully and in accordance with the methodology) and the cost of tools used (reducing risk and damage to the tool). Direct involvement of students in the project is also exercised, e.g., in the project 'Protective decorative thermomechanical treatment of wood cladding materials', a Thesis '*PAVASARS HOUSING CONSTRUCTION Ltd.*' was defended; in the project 'Development of a support system for the development of fire protection and structural connection solutions for wood construction products', there was a topic on the defects of glued in threaded rods, which was successfully elaborated in Diploma thesis in 2021. The direct involvement of students in the implementation of the project was possible by ensuring the active participation of the academic lecturer/researcher in the process of data preparation and collection.

*The lecturers have given several lecture courses at Aleksandras Stulginskis University (Lithuania), now Vytautas Magnus University, students.* The academic staff is also involved in the review of doctoral theses of the doctoral students from the Estonian University of Life Sciences (Estonia), Vilnius Academy of Arts (Lithuania), etc. Several colleagues have been involved in peer-reviewing scientific articles in scientific journals, such as the *European Journal of Wood and Wood Products*, *Drvna industrija*, *Baltic Forestry*, *Agronomy Research,* and others. Within the framework of the projects, scientific cooperation has been established with the Italian Institute of wood science *Bioeconomy Institute CNR-IBE* (former name *IVALSA*), developing research sections within the framework of the doctoral thesis and publishing joint scientific articles.

In the methods of teaching, the teaching personnel in the Wood Processing uses the knowledge-based experience that has developed within the framework of the implemented projects: National research programme 'Research of forest and subsoil resources, sustainable use – new products and technologies (ResProd), project 'Research in the field of wood processing, logistics and planning of forest products'; 'Validation of the latest lamination and protective decorative processing technologies'' – implemented within the framework of the project *Meža nozares kompetences centrs Ltd..* In addition, colleagues provide representation and activities in scientific associations: *COST Action FP1404 - Fire Safe Use of Bio-Based Building Products; COST Action FP1407 Understanding wood modification through an integrated scientific and environmental impact approach (ModWoodLife)*. Colleagues participate in the professional organisation EGOLF, which is related to the field of determining the characteristics of fire during combustion. Work in the Technical Committee 'Timber' of the Latvian National Centre of Standardisation is encouraged by colleagues. Political issues of the timber industry sector are addressed within the framework of the Forest Advisory Council of the Ministry of Agriculture of the Republic of Latvia. Opportunities for the professional development are promoted by representing the State Examination Commissions in several vocational secondary schools and technical colleges. ERASMUS+ and *Forest Science for Industry Development* summer school students from Colombia and Peru had lectures in English.

The professional orientation of students from primary, secondary, and vocational schools has been

implemented purposefully with future opportunities to attract young people to the studies at LLU. The long-term representation with students' research work (*ZPD*) in the Zemgale region is also related.

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

The assessment of the teaching personnel is based not only on their active participation in the field or science, but also on the assessments of students at the end of each term. The compliance of the teaching personnel is assessed before commencement of the study course, and one of the basic requirements is compliance with the Law on Higher Education Institutions; in addition, work experience in the implementation of the professional study programme is very important. The experience so far is the systematic growth of the academic staff and the expansion of the field of vision in other fields of science as well. Within the study courses, additional guest lecturers are invited in connection with a more detailed presentation of certain topics; such cooperation model is positively evaluated by students, as well as the lecturer can verify whether the presentation or handouts contain the most up-to-date information. The attraction of these guest lecturers to separate lectures is at the initiative of each lecturer, which is coordinated with the director of the study programme or the head of the department. This avoids the situation where there is a risk of providing incomplete or misleading information to the students.

At the time of submitting the Self-Assessment Report, the ratio of students and lecturers of the study programme ‘Wood Processing’ is 13.8. This number is unequivocally considered to be small, considering the state base funding available for the study implementation process. In recent years, this number has stabilised, which from the students' point of view can be seen as a positive indicator. The larger the number of lecturers, the more difficult it is for the student to perceive the set of requirements. But on the other hand, a larger number of lecturers expands the students' field of vision and scope.

After merging of the study courses, several lecturers are involved within the framework of one study course, one of which is the leading lecturer. The lead lecturer is responsible for posting the final grade of the study course as well. Within one course, lecturers shall coordinate the sequence and set of topics to be taught. This means that not only students, but also lecturers shall work together to ensure better knowledge transfer for students.

# Annexes

| | | |
|---|---|---|
| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | Annex_1_Students_statistics_WOOD_PROCESSING.pdf | 1_Pielikums_Studentu_statistika_KOKAPSTRADE.pdf |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | Annex_6_WOOD_PROCESSING_compliance_with_the_state_education_standart_v3.pdf | 6_pielikums_Atbilstība_valsts_standartam_KOKI_v2.pdf |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | Annex_7_The_compliance_of_the_study_programme_WOOD_PROCESSING_with_profesional_standard_v2.pdf | 7_pielikums_atbilstība profesijas standartam_KOKI_v3.pdf |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | WOOD_PROCESSING_mapping.xlsx | KOKAPSTRADE_kartejums_LV.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | WOOD_PROCESSING_study_plan_v2.pdf | Studiju_plans_KOKAPSTRADE_PL_NPL_Akreditacija.pdf |
| Descriptions of the study courses/ modules | Description_of_study_courses_WOOD_PROCESSING__v3.pdf | Studiju_kursa_apraksti_KOKAPSTRADE_v3.pdf |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | Diploms_kokapstrade_bak_EN.pdf | Diploms_kokapstrade_bak_LV.pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | Vienosanas_LLU and RTU_Production and processing_EN.edoc.docx | Vienosanās_LLU un RTU_Razosana_parstrade.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU confirmation concerning the study programme WOOD PROCESSING.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | | |
| Sample (or samples) of the study agreement | 18_Study_agreement.pdf | 18_Studiju_ligums.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | | |

# Wood Materials and Technology (51543)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Wood Materials and Technology* |
| Education classification code | *51543* |
| Type of the study programme | *Doctoral study programme* |
| Name of the study programme director | *Edgars* |
| Surname of the study programme director | *Bukšāns* |
| E-mail of the study programme director | *edgars.buksans@llu.lv* |
| Title of the study programme director | *Inženierzinātņu doktora grāds (Dr.sc.ing.)* |
| Phone of the study programme director | *63029184* |
| Goal of the study programme | *Goal of the Doctoral programme is to prepare highly qualified scientists for sub-sector of Material sciences - Wood materials and technologies, thus stimulating development of the engineering industry of wood materials and technologies, and to prepare high quality new generation of scientists of international level.* |
| Tasks of the study programme | *The mission of Doctoral studies is to ensure achievement of the goal of Doctoral studies, thus stimulating change of generations of scientists in the industry of Material sciences and rejuvenation of the academic staff of Forest faculty at Latvia University of Life Sciences and Technologies.Doctoral studies must ensure that new scientists:*<br>*• demonstrate the ability to set, formulate, manage and independently research topical and significant problems in the sub- sector of the industry;*<br>*• are creative and proficient in general and specific cognitive methodology;*<br>*• are able to adapt in implementation of national and international level research projects;*<br>*• gain comprehensive knowledge in the chosen industry and the related sub-sectors;*<br>*• acquire teaching skills and experience needed for junior academic staff in the university and for introduction of scientific society with results of their research in national and international audience;*<br>*• are able to elaborate and submit for defence their Doctoral thesis, for acquisition of scientific degree.* |

| | |
|---|---|
| Results of the study programme | *After completion of studies, students must be able to present knowledge, skills and competences that meet the level 8 of the European Qualifications Framework (EQF).*<br>*Knowledge:*<br>*Being able to demonstrate that he is familiar with and understanding the most pressing scientific theories and lessons in the subsector of the materials and technology, manages research methodology and contemporary research methods, is familiar with scientific language and terminology, has a systemic understanding of problems and theories in the field of wood science, the knowledge of theoretical and practical innovations in wood materials and technology.*<br><br>*Skills:*<br>*The ability to formulate a research problem and independently evaluate and select methods appropriate for scientific studies. The ability to implement important original research and summarize results in internationally quotable publications, the ability to implement research projects.*<br>*Capable of communicating, orally and in writing, their scientific scope with the wider scientific community and society as a whole.*<br>*Capable of independently raising their scientific qualifications, implementing scientific projects, capturing achievements relevant to the science sector international criteria, leading research or development tasks in companies, institutions and organizations where extensive research knowledge and skills are needed.*<br><br>*Competency:*<br>*Capable of performing an independent, critical analysis of the results of the results obtained, synthesis and evaluation, which allows addressing important research or innovation tasks in relation to the creation, improvement and development of wood materials and technologies.*<br>*Capable of independently raising current research ideas, planning, structuring and leading large-scale scientific projects, including international levels.* |
| Final examination upon the completion of the study programme | *PhD thesis* |

# Study programme forms

**Full time studies - 3 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *3* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *120* |
| Admission requirements (in English) | *Master's degree in Engineering in Wood Processing Technologies or related fields. If background is in other Engineering field aplicant need to pass an entrance exam* |

| | |
|---|---|
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Doctoral degree Doctor of Science (Ph.D.) in Materials Engineering* |
| Qualification to be obtained (in english) | - |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

**1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction**

The parameters of the study program have not changed significantly since previous accreditation, except for the name of the science sector in which the doctoral degree is assigned, and the name of the PhD degree to be assigned.

Cabinet Regulation No. 49/2018 “Regulations on science sectors and sub-sectors” states that the study program is implemented in Engineering and Technology material science sector, wood materials and technology subsector. In addition, Cabinet Regulation No. 1000/2005 “Regulations on the delegation of the right of grant of doctoral degrees to universities” states that the Latvia University of Life Sciences and Technologies has delegated rights to grant a PhD (PhD) in the scientific degree in material science.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

Only full-time students in the national language are studying in the study program. During the reference period (2013-2020), the study program annually studied between 10 and 3 doctoral students with a tendency to decrease in the number of students. The most students were captured in 2013/2014 and 2014/2015 study years by 4 students, completely completing budget places. For a reduction in the number of students in subsequent years, the explanation is the lack of the study support mechanism that was available for students by 2014. LLU implemented by the ESF funded project “Support for the implementation of PhD studies” (2010-2014), which was a great motivation for students and made an indispensable contribution to the acquisition of research opportunities, both for presentation of research results, and promoting study program and promoting university awareness abroad. In the last three years, only one student has been captured, putting the aim of seeking solutions and supporting systems for studying doctoral programs in the study program Wood materials and technology.

When analyzing the dynamics of the number of students (see Annex 5) and the reasons for the cessation of studies, the most frequent reason is the exarticulation in relation to the end of study time, which amounts to 53% of the total number of students during this period. Two students, or 11%, interrupted their studies in their second year of study after their own wish. The performance indicator – defended 6 doctoral thesis from 17 accounts for 35% can be rated as low. This is, of course, not the final result, since former doctoral practitioners may also defend doctoral work in the coming years.

The sustainability of the study program is currently at risk, taking into account the reduction of the number of PhDs and Latvian Council of Science experts involved in the realization of the study program due to age structure and insufficient succession in relation to the decline in student proportion and willingness to continue academic career after the doctoral degree is obtained. The drop in the number of students in recent years is a serious signal, for providing succession and building a new generation through PhD studies.

The creation of the new Ministry of Education and Science and the creation of doctoral schools may also contribute to an increase in the number of applicants, including competition for national budget places. Thus, with 2021, the number of state funded budget sites in this program is 5 (this allows planning 1-2 reflectance admission per year).

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.**

Study program parameters (name, degree to be assigned, study program purpose, tasks, achievable results, reception conditions) have a close linkage.

The study program name is wood materials and technology, which is an interdisciplinary science sector that is based on regularities of fundamental natural sciences (chemistry, physics, mathematics) and engineering covering wood material engineering, wood processing and processing technologies, and marketing and logistics of wood and wood products. After developing a theoretical course learning and promoting work and replacing, doctoral. study graduates obtain the highest scientific qualifications - a doctor of philosophy (PhD) degree that is relevant to the science nomenclature in Latvia, and is closely related to the content of the study program, the results to be achieved, the subject of the doctoral thesis to be developed.

Although according to Cabinet Regulation No. 49/2018 “Regulations on Latvian science sectors and subsectors”, the classification of Latvian science sectors, including this science sector, has been refined (2018) based on the internationally recognized classification of the OECD science sector FOS (Field of Science and Technology), according to the FRASCATI manual, and is defined as “Engineering and technology, including material science with sub-sector wood materials and technology”. The title of the doctoral study program “Wood Materials and Technologies” retains an interdisciplinary approach and gives a direct indication of the nature of the program, fields of scientific research and achievable results.

Reception conditions in the program provide a reflectance with an appropriate education that has acquired a master's degree in wood materials and a technology study program or equated to education (MK rules No 142/2012 “Procedures for the Agreement of Degrees and Professional Qualifications”). Taking into account wood materials and technology sector interdisciplinarity, reflectance who has acquired a master's degree in a related sector may qualify for studies by passing the entrance exam (study program director decision)

The study program aims are to educate skilled professionals for studying and research work with international standards-relevant competence in solving problems in the field of wood materials and technologies. The tasks defined for the implementation of the objective are closely linked to the achievable study results that enable educating specialists for academic and research work in high

school who are able to continue the development of the materials and wood materials and technology sub-sector of the technology; prepare specialists for public administration institutions that are dedicated to critical thinking and analytical capacities; and to build a generation of young scientists that are capable to work in projects, submit and manage them, prepare scientific publications in internationally recognized journals, raise the prestige and visibility of the Latvian wood processing sector science on a global scale.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The content of study courses is updated according to wood materials and technology science sector frameworks, theoretical and practical aspects of science, the latest directions and findings. Doctoral supervisors are closely linked to the wood processing sector, thus doctoral work topics are directly linked to the wood processing sector, coming from the scientific achievements and market requirements of the specific time period. The teaching staff at the same time work at the university and SIA "Institute of Forest and Wood Products Research and Development" in accredited laboratories which daily faces with the current problems of the commercial industry needs, and serve as a bridge between scientists and business. Therefore, it can be said that the content of doctoral courses flexibly adapts to the needs of the wood processing sector and labour market, and follows up to science achievements and advances in development.

The most flexible study courses that are continually updating and adapting to the needs of the industry in the doctoral study program wood materials and technology are special courses: a study direction special course (Material Science) and Wood Materials and Technologies. In these study courses, doctoral students specialize in the direction of doctoral thesis topict, obtaining especially in-depth knowledge in the narrow science directions related to the topic of Phd thesis. Thus, the knowledge obtained in learning these courses is significantly different for different doctoral studies, as these study courses profiles the direction of specialization of the young scientist.

An update of the general theoretical study courses is under the responsibility of the appropriate training staff, following up to the scientific development trends that are integrated into the specific study courses.

The scientific degree PhD is achieved in defense of the doctoral thesis, which is based on wood materials and technology of the materials and technology subsector of the industrial science sector in achievements, findings and innovations, especially showing the contribution of the work developed in this area. Each doctoral work defines novelty, scientific significance, and the importance of the economy, which is in close linkages to the science sector, benefits to the

economy and work to be developed. The Council for Material Science promoter has been established from experts from various institutions in forest science and forest science – together eleven members who evaluate the novelty and relevance of doctoral thesis to the economy.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

Information included in study courses (objective, achievable results) is closely related to the objectives, tasks and achievable outcomes of the study program (see program mapping).

The main research directions in which doctoral thesis is implemented are:

1) wood material science;

2) wood processing and processing technologies;

3) Marketing and logistics of wood and wood products.

The selected research directions are related to research activities, key research topics being implemented at the Department of Wood Processing of the Forest Faculty. The increase in wood use over the last decade and over the next decade will be significant in the context of the implementation of the green course strategy in Europe and the world. Wood, as ecological and $CO_2$-neutral material, will take an increasingly significant role in the construction sector. In approximated assumptions, it could be said that the use of wood in construction is lagging behind the Nordic countries for about 10 years. There is a very rapid increase in demand for wood materials in the Nordic country, with the Latvian timber industry being actively involved in supplying wood resources to Nordic countries. In the era of technology development, there is continually challenging to develop, improve, create innovative products and technologies where doctoral scientists should be actively involved. All doctoral work launched during the outlook period is closely related to industry and science development in the forest sector field. The growth of young specialists in the direction of study materials, wood materials and technology is a governmentally strategic task, as the share of wood processing sector exports is 20% of the country's total exports and the development of this sector should not be neglected. There is already a lack of highly qualified specialists - scientists in this specialization direction. Achieving this goal is closely linked to bachelor's and master's studies. One of the most significant shortcomings is the lack of human resources at the university and national level. If a bachelor's study level study request can be assessed as sufficient and good, then a master's and PhD educational level request for wood materials and technology in the sub-direction is rated as unsatisfactory, as evidenced by a succession-providing problem in human resources.

The development of doctoral work is followed by good practice involving bachelor's and master-level students in carrying out individual doctoral study tasks, thereby creating a potential interest for students of a bachelor and master's study level, a scientist academic career.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

According to the internal regulations of the LLU, a PhD study program (2019-2020) has undergone an update of study course descriptions to promote a student-centred study process with quality training. It includes innovative training methods, supporting study environments and individuals, study and research results based study processes, and provides the study content, structure and study process relevant to the study process, by selecting suitable training methods. For the assessment achieved by students, see Annex 10.

In formulating the results of the study course, the objectives of the study program, the tasks and the results of studies (knowledge, skills and competencies acquired in the course) are included. The doctoral study topic is first addressed by the director of the study program, a potential supervisor, and approved at the Department of Wood Processing meeting. To confirm that study results formulated in study courses and program are interconnected and achievable, mapping of study results is carried out. The mapping of study results shows that study courses fit into the study program and ensure that the objectives of the study program are achieved, making sure that the achievement of the results of studies takes place gradually and logically that the results achievable are interconnected, comply with the objectives and tasks of the study program.

Different methods are used to achieve study results: lectures, workshops, practical work, independent work, doctoral discussions during workshops, discussion between doctoral scientists, doctoral participation in conferences and workshops with reports, experience exchange trips to foreign research institutions, preparation of publications and their presentation, inter-results consultation and discussions at department meetings, professional consultant opinion hearing.

Outcome of study courses is evaluated in a 10-log system (theoretical study courses) according to the laws and regulations of the Republic of Latvia and the decision of the LLU Senate of 10 June 2015 (No 8-182), knowledge is assessed according to two criteria - qualitative and quantitative. For the qualitative criterion, a 10 points scale is used, for the quantitative criterion, the volume of the study course would be expressed in credit scores. The course is considered to be successfully learned if the rating is not lower than 4 (almost mediocre) or received credited. A compulsory visit to workshops and practical works is established in learning the study program courses.

When assessing the results of studies, the principles of valuation specified in the Cabinet Regulation No 240/2014 “Regulations on State Academic Education Standards” shall be complied with: the principle of openness, the principle of review of the assessment, the principle of valuation bonds, the principle of diversity of the test type and the principle of compliance and the LLU in the Regulations of Doctoral Studies (approved by Senate Decision No 8-201 of 11 November 2015).

The development and defence of the doctoral thesis is an integral part of the program, according to the Cabinet Cabinet Regulation No. 1001/2005 “Scientific PhD Degree Procedures and Criteria”.

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and**

**the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

**2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.**

The topics of the developed doctoral thesis are closely linked to priority research directions in the LLU defined in the LLU strategy (see https://www.llu.lv/sites/default/files/2020-12/StrategijaENG_8_12_2020.pdf), among them: Wood Material and Technology Studies.

During the review period, doctoral scientists have worked on actual topics related to innovative technologies in wood processing, exploring new wood product properties and technology, effects of wood processing types on product quality, wood fiber exploration, wood modification process and impact on product properties research, research of wood-based gluing processes, wood product life cycle studies, wood product life cycle studies, wood composite material making and product properties studies, wood composite material-making and product properties studies.

Research directions have largely been associated with innovations in the wood processing sector, which also have good commercial potential. Despite the focus on applied research, doctoral thesis are also addressing fundamental science issues that provide new knowledge for future development of the material science sector.

In the reference period (2013-2020), 6 PhD theses have been defended, their topics closely linked to current research directions and research topics to be addressed within them. In defence procedure obtained degree PhD (Dr.sc. ing.) in Material Science (until 31.12.2019.). Starting at 01.01.2020., the degree to be obtained will be a doctor of philosophy (PhD) in Material Science. By assessing that the PhD thesis contributes to the development of the material science sector, the topic spotlight needs to be assessed in the context of fundamental and applied science achievements. Part of the work developed is in the field of applied science, there are also fundamental developments that contribute to the contribution and justification of science theoretical knowledge. All defenced doctoral theses have been highly valued by the reviewers and the doctoral council receiving a consentient assessment.

**2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.**

The vision of students, graduates and employers for the practical realization of the study program, which allows understanding strengths and weaknesses, is important in the quality assessment of the doctoral study program “Wood Materials and Technologies”, seeking opportunities and

solutions for improving the performance of the program in 2020, a survey of students involved in a total of 6 doctoral and scientific degree applicants (54%).

In the survey, we look for **students'** satisfaction with the study process. Overall, respondents are satisfied with studies (67%) one respondent could not answer this question and one was unsatisfied.

For students, we asked about the relevance of the theoretical courses and the quality of implementation, the achieved results and skills for further implementation of the research work. 67% of students appreciated them, 17% could not provide a response. Analyzing student comments on theoretical courses, the study course for scientific writings was highly welcomed, while criticism was earned by study methodology and English special courses, which were recognized as insufficient for the level of doctoral studies.

Students were asked what was not satisfying in the study process. In a large consensus, 83% of respondents acknowledged that they were not satisfied by the small scholarship, and also pointed out insufficient funding for scientific work. The second most significant shortcoming, on which students have insufficient information on the availability of research infrastructure, was pointed out by 67% of respondents. One comment states that the university's various departments do not provide support for doctoral students. There was a problem that doctoral studies lack information on available research infrastructure and are not clearly the conditions for its use. This lack is also reinforced by respondents' answers to the next question of gaps in the implementation of doctoral work, where 50% of respondents indicated that there is a lack of establishment of certain equipment and analyses in the development of equipment promotional work. As a second most significant drawback, a lack of discussion on promotional work topics was pointed out, and one respondent in a comment pointed out that he would like to discuss promotional work topics once a month with all doctoral scientists and teachers.

By spring of 2021, PhD schools are established in Latvia, including the LLU, which aims to ensure the implementation of quality doctoral studies and the development of doctoral professional, including pedagogical and research, competencies in interdisciplinary environments, as well as in certain science sectors and sub-sectors under the LLU strategy. In the implementation of the PhD School project, doctoral scientists will also get grants to develop doctoral work, which can contribute significantly to the development of doctoral work, increase the quality of the PhD thesis.

When assessing the availability of different research programs in the LLU, we asked doctoral scientists about LU support tools in the development of doctoral work. 33% have positively noted this opportunity, 17% has not participated in such activity and 50% of the support was measured as insufficient.

One of the prerequisites for the successful development of doctoral work is the successful collaboration of doctoral work with the supervisor. 50% of those surveyed have confirmed this as good, but 50% have pointed out average collaboration. No respondent pointed out an inappropriate collaboration with the supervisor but generally features the need to improve and expand the resources of potential supervisors and their number.

Scientific paper preparation and research results presentation skills are of great importance in the appropriation of doctoral work results. We tried to clarify the self-evaluation of doctoral studies in this area. 17% of the respondents indicated satisfactory skills, but 83% on the need for improving skills in the preparation of scientific articles. Similarly, in the skills rating of the presentation of research results, 33% indicated the need to improve them while 67% demonstrated satisfactory skills. The low skill assessment of applicants' presentation highlights the need to improve them by more involving doctoral activities, project implementation, academic work implementation, giving

lectures and workshops for bachelor and master students on doctoral work topic.

Doctoral students were asked about the difficulties in the study process, 67% indicated difficulties in combining study and work, 50% indicated difficulties in developing study methodologies and a lack of data processing and interpretation skills indicated 33% of respondents. 33% of respondents indicated financial difficulties and one respondent indicated insufficient time to carry out voluminous studies.

When assessing the specificity of the doctoral work, including the support needed during its development, there is an emerging question of the need of two supervisors. 67% of those surveyed noted that they saw benefits while 33% indicated that they did not see the benefits.

Doctoral students participation in mobility programs offered by university and various funds is a major role for learning research skills. When interested in doctoral readiness for mobility, 33% gave a dismissive response until 67% of surveyed were answered, indicating that students lack information about mobility opportunities in the study process.

In the case of participation of doctoral school guarantees, 67% have been informed about these opportunities and have expressed their wish, while 33% have indicated that they are not aware of the funding model to be published.

In answering the question of doctoral interest in engaging in the activities of the LLU, 67% responded with interest if acceptable funding would be available. The results of the survey highlighted strengths and necessary development program for implementation where large support would be for the PhD school operating model and grants.

**A survey of graduates achieved PhD degree.**

A total of 6 respondents were surveyed, of which the survey was filled by 3 of them or 50%.

Graduates were asked whether they were dealing with research, and received a confirmatory response of 100% of the respondents that the research was dealing daily or part time. If we evaluate the direction of professional activities of all graduates, it can be said that 100% of everybody in their daily lives is related to research and scientific activities. Three Doctors are also working as teaching staff in the LLU and 3 national scientific institutions. As key changes in the far life, doctors mention additional duties in 66% of cases, career growth was marked by 33% of respondents and one respondent pointed out that a PhD did not help with the performance of professional duties.

As skills lacking in the study process in an equivalent proportion, the mathematical methods for data processing, the art of presenting research results, and autonomy in conducting studies that highlight the need for improvement of theoretical study courses.

When asked about the development of a study program of 100% unanimously, all respondents answered that doctoral scientists should be involved in project implementation and need to seek additional funding for research. 33% of respondents indicated that student mobility should be encouraged.

When asked or the presence of a PhD allows for better addressing of daily situations, a denial or difficult to say the assessment is received, which indicates the hypothesis that it is difficult to assess the contribution of personal growth and the impact of a PhD on further professional activity.

In questions of project implementation and follow-up to current project calls, an ambiguous response has been received in part by answering that yes and in part, that no, which is related to the active academic load at university work, reducing the possibility of engaging in project preparation and enforcement. From a load planning perspective, the university needs to optimize

employee engagement in academic and organizational work in a way that remains the resource to work in scientific activities.

The results of the survey are analysed and are at first discussed in the primary responsible department. The main focus is on the weaknesses identified as a result of the survey. Then more senior university officials have been reported about survey results. Week points have been identified and proposals have been developed for the transition of doctorates to a doctoral school model that would resolve many negative feedback on the current study program. The main causes of frustration were the lack of funding for doctoral studies, which are currently being solved at university through a grant support mechanism however it does not provide support for all doctoral students.

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

During the reporting period, doctoral students have not used ERASMUS mobility opportunities. During the reporting period, one student went on science mobility trips to the Italian Institute of Wood Science at the IVALSA and Bioeconomy Institute CNR-IBE in Italy, the LLU project, “Plywood with improved resistance to the effects of the environment”.

During the reference period, foreign doctoral students have not participated in the mobility.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

Financial provisioning. Sources of funding for the PhD program are national budget funds designed to implement the study program; funding provided for implementation of scientific infrastructure; science-based funding; LU research program grants; ERAF funding for improving the material base.

The extent of the state-funded study sites is aligned in a tripartite agreement between the Ministry of Education and Science, Ministry of Agriculture and LLU. In the trilateral agreement on funding for 2020, it is established that the baseline cost of one study site is 1519.98 EUR, the study level factor for the doctoral program is 3 and the social security of the study site for the doctoral program is 2034 EUR, the cost factor for education thematic area studies for the doctoral study program “wood

materials and technologies” is 1.8 (Cabinet Regulation No 994/2006 “Procedures for which universities and colleges are funded from public budget funds”), cost per student in this program is 10235.07 EUR.

Each year, the LU Senate confirms the distribution of revenue and expenditure of the general budget structure of the LLU, prepared according to the Saeima's annually accepted Law on State Budget and the Rector Order of the LLU “On the planning of the LLU budgets”. The general budget control and audit shall be carried out by a sworn auditor, whose opinion and review report shall be examined and approved by the Senate of the LLU.

Prior to approving the revenue and expenditure breakdown of the general budget of the LLU in the Senate, it shall be examined, discussed and approved by the Task Force on Resource Use and Development, consisting of the Rector, Chancellor, Recreators, dean of all faculties, head of the Resource Accounting Centre/Chief Accounting Officer, head of the Financial Planning Centre, chief economists, key specialists in real estate and legal matters.

The total distribution of the general budget of the LLU shall be made up of estimates of departments/faculties where the cost of the type of expenditure is envisaged.

State funding by year:

2019, in the framework of the trilateral agreement on State funding for the program, one study site costs EUR 1518.98, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 10234.47 EUR.

2018, in the framework of the Tripartite Treaty on State financing for the program, it is established that the cost of one study site is 1458.51 EUR, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 9906.60 EUR.

2017, in the framework of the trilateral agreement on State funding for the program, one study site costs EUR 1393.33, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 9557.40 EUR.

2016, as part of the annual trilateral agreement on State funding for the program, it is established that the cost of one study site is 1333.11 EUR, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 8113.79 EUR (funding security 84.45%).

2015, in the framework of the trilateral agreement on State funding for the program, one study site costs EUR 1333.11, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 8114.16 EUR (funding security 84.46%).

2014, in the framework of the trilateral agreement on State funding for the program, one study site cost is estimated at EUR 1333.11, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of education for the program is 1.8, the cost per student in the program is 8061.53 EUR (funding security 83.72%).

2013, in the framework of the trilateral agreement on State funding for the program, one study site costs EUR 1333.36, the study level factor is 3 and the social security of the study site is 2034 EUR, the thematic area of the education area is 1.8, the cost per student in the program is 7855.58 EUR.

The materials-technical provisioning of the study program is capable of ensuring an effective study

process, including the development of a doctoral thesis on a selected topic. Doctoral students have opportunities through e-environment, to study independently and communicate with teaching staff electronically. Studio materials are placed in an e-environment, in the e-studies established by the LLU, which are available on https://estudijas.llu.lv/?lang=en

For the preparation of the PhD thesis, including the creation of a theoretical review of the doctoral work, there is an available LLU Fundametal Library with a wide range of scientific literature and diverse databases in the electronical catalogue of the https://llufb.llu.lv/en Various options are offered for information search. Databases: AGRIS; FU Fundamental Library Electronic Catalogue of the "LLU Fundamental Library", "publications of LU training staff and researchers", "PhD thesis defensed at LLU", "LLU journal and conference articles". Subscribed databases, e-journals, e-books: CABI abstract, CABI Animal Health and Product Compendium, CABI Crop Protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO e-book Academic Collection, EBSCO database, newspapers library, Lettonese, ScienceDirect journals, SCOPUS, Escival, Web of Science, Wiley Online. Library inventories in thematic areas (% volume) are as follows: agriculture (38%), natural sciences (10%), social sciences (24%), machinery (19%), other science sectors (9%) and internet resources (encyclopedia, dictionaries), information searchers and portals (CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer link, etc.). As of June 11, 2012, the LU Fundamental Library provides access to subscribed databases outside the LLU network with an EZproxy tool using the LLU Information System or e-studio user account.

Doctoral work development has various laboratories designed and maintained in collaboration with the Forest and Wood Products Research and Development Institute. Laboratories are divided into the following operational directions: laboratory for research and testing of wood physical-mechanical properties, biofuel testing and research laboratory, fire testing and research laboratory, furniture testing and research laboratory. During the reference period, new equipment for emission of volatiles from wood products, ash melting temperature detection equipment, material mechanical properties detection equipment for small-sized wood samples, an infrared thermal camera for thermal parameters analysis, a high-speed video camera for the fixation of dynamic processes and analysis, equipment for determining wood moisture as well as auxiliary equipment, for the manufacture of samples and their displacement, have come into laboratory equipment. Existing laboratory equipment does not cover research directions for wood chemistry, but on those topics university uses collaboration with the Latvian State Institute of Wood Chemistry, where good infrastructure is available in the chemical processing of wood.

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

Doctoral activities for the development of doctoral work are available at the laboratory of the Research and Development Institute of the LLU, "Forest and Wood Products Research and Development Institute", as well as the Latvian State Institute of Wood Chemistry. Collaborative opportunities are rated as very good, especially if common projects are realized. Students of study program Wood materials and technology have been the employees of "Forest and Wood Products Research and Development Institute" Ltd and the Latvian State Institute of Wood Chemistry already during doctoral studies, and continues their scientific work after obtaining a PhD degree.

Good collaboration opportunities are with Riga Technical University, where currently one doctoral

study is conducting research using the technical capabilities of the RTU, which is not available for LLU on the topic of doctoral thesis. The most important partner of the LLU in Material sciences direction is the RTU agreement on support of study processes, in cases where one of the study programs is closed.

There are foreign cooperation opportunities where collaboration with Ecole Superieure du Bois (France), Poznan University of Life Sciences (Poland), Kaunas University of Applied Sciences (Lithuania), Tallinn University of Technology (Estonia) has developed by the Chair of the LLU wood processing department. The teaching staff involved in the study program have good contacts with other universities and research institutes in the field of wood science where PhD students may have opportunities to go into the short term scientific missions, such as within the COST activities where active membership is also taken by LLU teaching staff. Also, in the framework of mobility, especially ERASMUS, doctoral studies have access to a collaborative university material-research base for the implementation of studies that have not been used by students in the doctoral study.

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

The composition of the teaching staff of theoretical studies has remained unchanged during the reporting period, except for the professional English language, where the teaching staff change has occurred. In total, 8 persons in teaching staff are involved in the realization of the study program, of which 5 professors, 2 assistant professors, and one in a lecturer. The number of potential supervisors has decreased significantly (around 6). As new teaching staff in this area involved three persons who are currently in the position of the professor and two in the assistant professor position. Currently, three Latvia science council experts in the forest engineering sector, wood materials and technology subsector are available in the study program. In total, four supervisors are currently available in the study program, who qualify according to the Latvian Agricultural University by-law on doctoral councils. The supervisor may also be approved from partner institutions at the same time as a second supervisor assigned from the LLU.

The evaluation of doctoral work is carried out in a doctoral council consisting of 2 Latvia science council (LSC) experts from Latvian Agricultural University and 3 LSC experts from Latvian State Institute of Wood Chemistry.

The sustainability of the study program, looking through the prism of personal resources, is currently rated as endangered. A change in the succession of potential supervisors - 50% is a signal that activities and motivations programs for the development of personal resources in the near future should be focused. The proportion of potential supervisors is a very important factor helping to improve the quality of PhD thesis, through regular consultation of work results at the meetings of the Department of Wood processing of the Forest Faculty.

### 4.2. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting

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

In accordance with Section 55 (1) (3) of the Universities Law, a minimum of five persons with a doctoral degree shall participate in the implementation of the academic doctoral program, of which at least three are experts of the Latvian Council of Science in the relevant field. In total, 8 teaching staff are involved in the realization of the study program, of which 5 professors, 2 assistant professor positions, and one in a lecturer, 7 of whom have a PhD degree and one teaching staff is with a master's degree. Currently, three LSC experts in the forest engineering sector, wood materials and technology subsector are available in the study program.

The qualifications of the teaching staff shall comply with the conditions of implementation of the program and the requirements of regulatory enactments. In addition, the LLU “Doctoral Studies Regulations” (approved by Senate Decision No. 8-201 of 11 November 2015) highlights that a doctoral study program is being implemented by highly qualified LLU academic and scientific staff.

The PhD program provides theoretical courses in which teaching staff educates doctoral studies in current science theories and lessons, diversity of research methods and use based, research data processing capabilities and results presentation, in the preparation of scientific articles that contribute to doctoral study outcomes, especially knowledge and skills achievement. The knowledge and competence of the teaching staff is the basis for achieving these results in this field. Supervisors helps to develop doctoral autonomy of Phd student to conduct research work, summarize results, defend accomplishments, and motivate to delve into topic, seek, explain research results, with their example and authority contribute to study results, especially achievement of compliances. Learning knowledge, working in research projects, publishing scientific results, reports at conferences, congresses, symposia, etc. are the basis for achieving these results in this area.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

The number of academic staff publications involved in the implementation of the doctoral study program during the reference period is summarized in Table 4.1.1. Publications of the personnel of the study program are summarized in the Annex.

Table 4.1.1.

Academic Staff Publications (2013-2020)

| Publication | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| Total at SCOPUS | 8 | 10 | 13 | 11 | 14 | 15 | 17 | 18 |
| Total at WoS | 10 | 11 | 10 | 13 | 19 | 6 | 5 | 1 |

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

During the reporting period, PhD study program implementers have participated in research projects of the National Research Programs, two COST actions, research funded by Latvian Science Council, ERAF projects and training project Skilled UP. Similarly, scientists have also used the opportunities of LLU internal research projects involving master and doctoral students. In project implementation, academic staff have been project managers or key performers. The list of projects implemented during the reporting period is summarized in the Annex.

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

Academic staff involved in the implementation of the doctoral study program have participated in the implementation of national and international projects, such as:

- National Research Program National Research Program 2014.10-4/VPP-6/6 “Exploring forest and land-based resources, sustainable use – new products and technology” (ResProd) (2014-2017) sub-project “Research on forest and land-based resources, sustainable use – new products and technologies”, which were essentially a major contributor to the PhD study program for students, as doctoral scientists were involved in the project and had the opportunity to realize research activities related to PhD topic, but for researchers it is a qualification increasing event that is later passed on to students.
- COST Action FP 1407 (Understanding Wood Modification Through an Integrated Scientific and Environmental Impact Approach (ModWoodLife)) and FP 1404 (Fire Safe Use of Bio-Based Building Products) participated in training staff who obtained knowledge and used it for doctoral studies. COST actions are a good information platform that brings together scientists from various countries. As part of the Cost action activities are summer schools and short-

term scientific missions that have already been developed for doctoral students, while for researchers it has been a very good information-generating platform and the establishment of international contacts that open up an opportunity for international collaborative projects.

- Projects funded by the ERAF have also served as a basis in the development of PhD works that improve both the qualifications of the training staff and also improve the quality of doctoral studies.
- The researchers involved in the realization of the study program also use the LLU internal project support tools to conduct fundamental research involving doctoral activities.

Leading researchers, researchers, master students and doctoral students are participating in project implementation, developing their PhD thesis. The competencies obtained in project development are the basis for guiding PhD thesis in the field of forest science and the offer of new PhD topics.

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

The theoretical part of the doctoral study program consists of two blocks. General theoretical courses: study methodology, professional foreign language specialist and preparation of scientific articles that enter student in philosophy of science, assist in learning, research planning and data processing, building skills to prepare scientific articles and present research results at international scientific conferences. A second block of theoretical studies is related to doctoral specialization in the topic of doctoral work and culminates with doctoral exams in study courses for the wood materials and technology sub-sector and a special course of the study direction. In this block of theoretical studies, doctoral students specialize in the study direction, conducting a situation study and learning the national and international relevance of the subject topic in the context of the wood processing sector. In these courses student should learn the skills to focus on cross-sectoral interface issues, which can lead to improvements in quality of PhD thesis. Industry professionals are involved in the realization of these studies, helping to train the doctoral student in the chosen direction of specialization. Other credit points are obtained in the development of PhD work, publication of results and presentation of results at international conferences. In the study process, doctoral scientists gain the knowledge, competencies and skills necessary for the qualifications of a young scientist in the material science sector, wood materials and technology sub-specialization.

The study plan is designed with a logical succession during 3 study years, so that the necessary theoretical knowledge would be provided in agreement with progress in doctoral work development.

The ratio of students and faculty at the time of preparation of the report is 5.1.

# Annexes

| | | |
|---|---|---|
| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | Annex 5. Students statistics.docx | 5. pielikums KMT statistika.pdf |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | | |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | Wood materials and technology_mapping.xlsx | Koksnes materiāli un tehnoloģijas kartējums_LV.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | 9. pielikums KMT plāns ENG.pdf | 9. pielikums KMT plāns.pdf |
| Descriptions of the study courses/ modules | Study programm description KMT.pdf | Studiju kursu apraksti_KMT.pdf |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | PH.D diploma Wood Materials and Technology.pdf | Doktora_diploms_Koksnes mater_tehnol_LV (1).pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | Agreement between_LLU and RTU in case of discontinuation.docx | Vienosanās_LLU un RTU_Razosana_parstrade.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Sample (or samples) of the study agreement | 18_Study_Agreement_LV_EN_2020.pdf | 18_Studiju_ligums.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | dok_stud_progr_Koksnes materiāli un tehnoloģijas_AIP atzinums_EN.docx | Nr_26_LLU_par 250 stud_doktora Koksne.edoc |

# Food Science (51541)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Food Science* |
| Education classification code | *51541* |
| Type of the study programme | *Doctoral study programme* |
| Name of the study programme director | *Inga* |
| Surname of the study programme director | *Ciproviča* |
| E-mail of the study programme director | *inga.ciprovica@llu.lv* |
| Title of the study programme director | *profesore, Dr.sc.ing.* |
| Phone of the study programme director | *26523437* |
| Goal of the study programme | *to educate qualified specialists for study and research work with competence in solving problems in the science field of food and beverage technology in accordance with international standards.* |
| Tasks of the study programme | *1. To acquire in-depth theoretical courses in food and beverage technology.*<br>*2. To be able to formulate, research and solve current problems in the field of food and beverage technology science, in accordance with the principles of research work.*<br>*3. To master the latest research methods and acquire skills to apply them in practice.*<br>*4. To acquire the latest information technologies for research planning and processing of the obtained experimental data.*<br>*5. To manage foreign language skills for presentation, discussion and defence of research results.*<br>*6. To acquire skills for summarizing, presenting and publishing the results of scientific work in national and foreign scientific issues.*<br>*7. To develop, prepare and defend the promotion work with its original contribution to obtaining a doctoral degree.* |

| | |
|---|---|
| Results of the study programme | *Upon completion of their studies, students must be able to demonstrate knowledge, skills and competences that correspond to level 8 of the European Qualifications Framework (EQF).*<br>*Knowledge:*<br>*Is able to understand current scientific theories and facts in the field of food and beverage technology science, manage research methods and navigate interdisciplinary research opportunities.*<br>*Skills:*<br>*Ability to formulate a research problem, independently evaluate and choose methods appropriate for scientific research, ability to implement significant original research and summarize the results in internationally cited publications, ability to implement research projects.*<br>*Ability to communicate with the scientific community in research areas.*<br>*Ability to discuss freely, conclude and make proposals for solving problems, ability to logically present and structure the results of their work, ability to argue and defend their opinion, ability to take responsibility for decisions, ability to work in a team, ability to independently and responsibly fulfil tasks, plan time and meet the set deadlines.*<br>*Competencies:*<br>*To carry out independent, critical analysis, synthesis and evaluation of the obtained research results, which allows solving important research tasks in food and beverage technology. The ability to independently put forward a research idea, to plan, structure and manage scientific projects, participate in the implementation of international projects is developed.* |
| Final examination upon the completion of the study programme | *Public defence of doctoral thesis.* |

# Study programme forms

**Full time studies - 3 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *3* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *120* |
| Admission requirements (in English) | *Master's degree in food science or equivalent education. Applicants with a master's degree in another related field should pass an entrance examination in the chosen field of science. Knowledge of English at least at B2 level is a mandatory requirement for a study programme implemented in English.* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Doctoral degree Doctor of Science (Ph.D.) in Food and Beverage Technologies* |
| Qualification to be obtained (in english) | - |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Full time studies - 3 years - english**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *3* |
| Duration in month | *0* |
| Language | *english* |
| Amount (CP) | *120* |
| Admission requirements (in English) | *Master's degree in food science or equivalent education. Applicants with a master degree in another related field should pass an entrance examination in the chosen field of science.* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Doctoral degree Doctor of Science (Ph.D.) in Food and Beverage Technologies* |
| Qualification to be obtained (in english) | - |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

**1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction**

The parameters of the study programme have not changed significantly since the previous accreditation, with the exception of the name of the science sector, in which a doctoral degree is granted, and the name of the doctoral scientific degree.

Regulation of the Cabinet of Ministers of the Republic of Latvia No. 49/2018 "Regulations on Sectors and Sub-sectors of Science in Latvia" stipulates that the study programme is implemented within "***Other engineering sciences and technologies, including food and beverage technologies***" sector. In addition, the Cabinet Regulation No. 1000/2005 "On Delegation of Powers to Confer the Doctoral Degree (Promotion) to Higher Education Institutions" stipulates that the Latvian University of Life Sciences and Technologies (hereinafter – LLU) has been delegated the right to grant ***the doctor of science (PhD) in food and beverage technologies***.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

Only full-time students study in the study programme in the national language. During the reporting period (2013-2020), **16** doctoral students studied in the study programme annually. The number of students has an upward trend, although in some study years (e.g., 2013/2014, 2015/2016 and 2016/2017) there was a lower proportion of students. The explanation for the reduction of the number of students during this period is the lack of study support mechanism which was available to students until 2014. LLU implemented the ESF-funded project "Support for Doctoral Studies in LLU" (2011-2014), which was a great motivation for students and gave an invaluable contribution to research opportunities, presentation of research results and promotion of the study programme and visibility of the university abroad.

The increase in the number of students from 2017, is explained by the improvement of the study research base, the acquisition of new, unique research equipment in the Faculty of Food Technology, which has made it attractive to new doctoral students, including the diversification of research directions and closer entries in research.

When analysing the dynamics of the number of students (see Annex 5) and the reasons for leaving studies, most commonly they have been not returning from the academic leave (2.38%), non-execution of the study programme (2.38%) and leaving by their own desire (2.38%).

In recent years, the number of students on state funding has increased, which is a positive indicator

of the study programme and its sustainability.

The new initiatives of the Ministry of Education and Science and the creation of Doctoral Schools in higher education institutions can also contribute to the increase in the number of students, including competition for state funded study places. Thus, for this study programme, there are 18 state funded study places in 2021 (this will allow to plan the admission of at least 6 applicants per year).

The number of students and the admission limits are optimal for the implementation of studies, achieving study goals and individual's personal intentions, promoting the renewal of the teaching staff of the Faculty of Food Technology, further development of research directions, and purposefully improving the technical base and promoting excellence in research.

The study programme is developed to realisation in English, and within the framework of accreditation, the possibility to acquire the right to implement the study programme in English is requested.

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.**

The parameters of the study programme (title, degree to be awarded, aim of the study programme, tasks, results to be achieved, admission conditions) are closely related.

The title of the study programme includes *food science*, which is an interdisciplinary branch of science (a branch based on the regularities of fundamental natural sciences (chemistry, biology, physics) and engineering sciences applicable in the investigation of food chemical, biochemical, physical properties and processing processes). Although according to the Cabinet of Ministers Regulation No. 49/2018 " Regulations on Sectors and Sub-sectors of Science in Latvia", the classification of Latvian branches of science, including this branch of science, was specified in 2018, based on the internationally recognized OECD FOS (Field of Science and Technology) classification, according to the FRASCATI manual, it is defined as "*Other engineering sciences and technologies, including food and beverage technologies*". Such a name for food science really diminishes the scale of the scientific field. The title of the doctoral study programme "Food Science" maintains the interdisciplinary approach, gives a direct reference to the essence of the programme, areas of scientific research and the results to be achieved.

Degree to be awarded - *Doctor of Science (PhD) in food and beverage technologies* corresponds to the nomenclature of science in Latvia, and is closely related to the content of the study programme, results to be achieved, topics of doctoral theses, research objects – plant and animal raw materials for food and beverage production and the products obtained from them, as well as the processes and equipment necessary for their development.

The aim of the study programme is *to educate qualified specialists for study and research work with competence in solving problems in the science field of food and beverage technologies in accordance with international standards*. The tasks defined for the implementation of the aim are closely related to the achievable study results, which allows to educate specialists for academic and research work at the university, who are able:

1) to continue the development of the food and beverage technology industry;

2) to prepare specialists for public administration institutions endowed with critical thinking and analytical skills;

3) as well as to form a generation of young scientists who are able to work on projects, including applying for and managing them, prepare scientific publications in internationally recognized journals and proceedings, raise the prestige and recognition of the Latvian food and beverage technologies science sector on a global scale.

Admission conditions of the programme intend for the admission of applicants with appropriate education who have obtained a master's degree in food science or an equivalent education (Cabinet of Ministers Regulation No. 142/2012 "Procedures for Equalisation of Degrees and Professional Qualifications"). Considering the interdisciplinarity of the field of food and beverage technologies science, applicants who have obtained a master's degree in a related field can apply for studies by passing the entrance examination (decision of the director of the study programme). Most often the education of these applicants (master's degree) is obtained in the fields of chemistry, biology, nutrition, food hygiene or agriculture.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master’s and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The content of the study courses is updated in accordance with the principles of the field of food and beverage technologies science, theoretical and practical aspects of science, the latest directions and findings. The lecturers of the theoretical courses constantly update the content of the courses, as they are implemented by the lecturers, whose research work is closely related to the topics of the course (Research Methodology in Food Science, Multivariate Data Analysis I and II, etc.). Similarly, the promotion work is supervised by lecturers with experience in a certain sub-branch of food and beverage technologies. Updating the content of courses and the content of doctoral theses to be developed, in accordance with the development trends of food and beverage technologies science, is promoted by lecturers' research work, publications in scientific journals, participation in international conferences and organization of international conferences/congresses and other scientific events.

In defending the doctoral thesis, the awarding of a doctoral degree is based on the achievements, findings and innovations of the food and beverage technologies science branch (sub-branch), especially showing the contribution of the developed work in this field. Each doctoral thesis defines novelty, scientific significance and economic significance, which is closely connected with the field of science, benefits for the national economy and the work to be developed.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The information included in the study courses (aim, results to be achieved) is closely related to the aim, tasks and achievable results of the study programme (see Annex 8. *The mapping of the study programme Food Science study courses*).

The main research directions in which the development of doctoral theses is implemented are:

1) food safety and risks;

2) reduction and rational use of production by-products and waste;

3) new products from raw materials of plant and animal origin, their nutritional research;

4) research of biologically active substances in food raw materials and products.

The chosen research directions are related to research activities and the main research topics that are implemented at the Faculty of Food Technology. These research directions have established themselves as the world pays more and more attention to processing technologies with minimal effect on labile food compounds in an effort to maintain the stability of biologically active substances. Biologically active substances in food raw materials and products improve the functions of the human body, preventing the formation of undesirable compounds. By looking for ways to preserve biologically active compounds, to identify their composition and content, new products with positive health effects can be developed.

The food market, which is subject to globalization and competition, also poses a challenge to operate in a highly competitive environment and to work on the development of new processes, technologies and products in search of solutions for the use of scientifically based, nutritionally essential products.

Food safety is a key factor in ensuring public health, and comprehensive research into food safety, the emergence of potential compounds in its production, and the factors that contribute to it are areas of scientific research and new results. Integrated food production, including the processing of by-products and residues into value-added products, is one of the key challenges of the European Green Deal, and promoting research to accumulate new knowledge and results is helping economic sectors to find solutions for environmental sustainability.

When developing a doctoral thesis in one of the current research directions and their priority research topics, there are opportunities to gain new insights, implement research projects (national and international), in the implementation of which it is possible to invite master's and bachelor's level students. For a list of priority research topics in which doctoral theses are developed, see section 2.5. For information on the topics of the defended thesis and their connection with LLU strategic research directions, see annex *Defended doctoral dissertations themics during 2013-2020*.

**2.3. Assessment of the study implementation methods (including the evaluation methods)**

**by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

In accordance with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) adopted in the Year 2015, the implementation of the doctoral study programme "Food Science" encourages doctoral students to actively participate in the study process through student-centred learning, thus stimulating doctoral students motivation, self-reflection and involvement in learning.

In accordance with the internal regulatory enactments of LLU, the doctoral study programme (2019-2020) has been updated in order to promote a student-centred study process with quality training. It includes innovative teaching methods, a supportive study environment and individuality, a study process based on study and research results, and ensures the study content, structure and interactivity of the study process corresponding to the aim and planned results of the study process by choosing appropriate teaching methods. See Annex 10 for the assessment of student achievements.

When formulating the results of the study course, the aim, tasks and study results of the study programme (knowledge, skills and competences to be acquired in the course) are evaluated. In order to confirm that the study results formulated in the study courses and the programme are interrelated and achievable, the mapping of the study results is performed. Mapping of study results shows that the study courses included in the study programme ensure the achievement of the study programme aim, allow to ascertain that the study results are achieved gradually and logically, that the results are interconnected, they correspond to the study programme aim and objectives.

Various methods are used to achieve the study results: lectures, seminars, practical work, independent work, doctoral students' discussions during seminars, exchange of experience, discussion between doctoral students.

Acquisition of study courses is assessed in a 10-point system (for theoretical study courses) in accordance with the laws of the Republic of Latvia and the decision of the Senate of LLU of June 10, 2015 (No. 8-182), knowledge is assessed according to two criteria - qualitative and quantitative. A 10-point scale is used for the qualitative criterion, and the amount of the study course is expressed in credit points for the quantitative criterion. The course is considered successful if the grade is not lower than 4 (almost satisfactory) or an undifferentiated assessment “passed” is received. Compulsory attendance of seminars and practical work is defined in the acquisition of the study program courses.

When evaluating the study results, evaluation principles of the Cabinet of Ministers of the Republic of Latvia Regulation No. 240/2014 "Regulations on the State Academic Education Standard" are taken into account: openness principle, evaluation review principle, evaluation obligatory principle, examination type diversity principle and compliance principle, including LLU Doctoral Study Regulations (approved by the Senate decision no. 8-201).

An integral part of the programme is the development and defence of the doctoral thesis, in accordance with the Cabinet of Ministers of the Republic of Latvia Regulation No. 1001/2005 "Procedures and Criteria for the Conferral of a Doctoral Degree in Science (Promotion)".

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

**2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.**

The topics of the developed doctoral theses are closely related to the priority research directions of LLU, which are defined in the LLU strategy (see https://www.llu.lv/sites/default/files/2020-12/StrategijaENG_8_12_2020.pdf - *in Latvian*), among them are:

1) reduction and rational use of production by-products and waste;

2) new products from raw materials of plant and animal origin, their nutritional research;

3) research of biologically active substances in food raw materials and products;

4) food safety and risks.

During the reporting period (2013-2020) 30 doctoral theses were defended, their topics were closely intertwined with research directions and research topics to be addressed within them. In total, 10% of the defended works address the issues of rational use of production by-products and waste. The majority of doctoral theses (40%) are closely related to the research of new products and their nutritional value, 20% of doctoral theses are related to the research of biologically active substances and their stability, and 30% – to food safety and risk.

Defending the thesis, a doctoral degree in engineering science (Dr.sc.ing.) in food science (until 31.12.2019) or a doctoral degree - doctor of science (Ph.D) in food and beverage technologies (starting from 01.01.2020) is obtained.

The promotion work addresses topics relevant to the food industry, some of the topics are closely related to the industry, have provided a scientific basis for the introduction of technologies or decision-making.

Considering that the developed doctoral theses contribute to the development of the field of food and beverage technology, the topicality of the topics must be assessed in the context of fundamental and applied achievements. Some of the developed works are in the field of applied science, there are also fundamental developments that provide input and substantiation to the theoretical findings of science.

See the topics of the defended works in the annex *Themes of the defended doctoral theses 2013-2020* (in Latvian).

**2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.**

In the evaluation of the quality of the doctoral study programme "Food Science", the vision of students, graduates and employers about the practical implementation of the study programme is important, which allows to understand the strengths and weaknesses, look for opportunities and solutions to improve the programme performance.

In 2020, a **survey of students** was carried out, in which 13 doctoral students (53% of students) and applicants for a scientific degree (71% of applicants) participated.

The results of the survey showed satisfaction with the study process. In general, the respondents are satisfied with the studies (92%), only 8% could not give an answer about the programme as a whole, because there are students of the 2$^{nd}$ study year.

The next question was about the usefulness of the theoretical courses and the quality of implementation, the achieved results and skills for further implementation of the research work. 85% of students evaluated them positively, 15% could not give an answer. Analysing the students' opinion about the theoretical courses included in the programme, students noted that prior knowledge is required in data processing and the use of statistical methods, which may hinder the full-fledged acquisition of courses. At the same time, students noted that theoretical courses have given prior knowledge to independently acquire and apply non-parametric data processing methods. It is positive that the theoretical courses have helped to understand more clearly the methodology of doctoral thesis development, to create a research plan, to choose the most appropriate research and data processing methods.

Students were asked to define what was not satisfactory with the study process. Here students had different reasons: 24% pointed to insufficient funding for the development of scientific work, 48% noted small scholarships, 10% mentioned that there is not enough information about the possibilities to determine the planned parameters, etc., while 14% did not see any problems. Analysing these answers, it must be admitted that the scholarships are indeed very small (113.83 EUR). Starting the spring of 2021, doctoral schools will be established in Latvia, including LLU, with the aim to ensure the implementation of high-quality doctoral studies and the development of doctoral students' professional, including pedagogical and research, competencies in an interdisciplinary environment, as well as in certain branches and sub-branches of science in accordance with the strategy of higher education institution.

In the implementation of projects administered by the doctoral school, doctoral students will receive grants for the development of the doctoral thesis, which will also be the doctoral student's remuneration, which can significantly promote the development of doctoral theses and increase the quality of development. Although 1/4 of the respondents have indicated insufficient funding for scientific work development, it should be noted that since 2017 LLU is implementing the scientific capacity strengthening program aimed at promoting the development of priority research directions and corresponding doctoral theses. This program grants support doctoral students in research, presentation of results in international scientific events (conferences, congresses, symposia, etc.) and publications in scientific journals. It should be noted that practically all doctoral students of the 2nd and 3rd study years receive these grants (funding 8000 EUR in two years). Doctoral students are also employed as research assistants in the implementation of research projects (European Agricultural Fund for Rural Development, Market Oriented Projects, European

7th Framework Program projects, projects funded by the Latvian Science Council, Norway Grants Programme projects, etc.), which is serious support for doctoral thesis development.

Doctoral students were asked what is missing at the university for the implementation of the planned doctoral thesis. 20% of the respondents indicated that the research base (equipment, analytical equipment) is sufficient and is constantly updated (see sections 3.1 and 3.2). 30% indicated that there is a lack of specific equipment/hardware, although at the same time they noted that there are opportunities to find a solution to implement the planned process differently or to cooperate with other Latvian research institutions/universities. 20% of doctoral students indicated that purposeful involvement of doctoral students in the development of research projects is not implemented. This opinion can be accepted partially. Supervisors involve their doctoral students in research projects and 75% of the surveyed doctoral students participate in the implementation of projects. This directly indicates the purposeful involvement of doctoral students in research activities.

Evaluating the availability of various research programs at LLU, we asked doctoral students about LLU support tools in the development of the doctoral thesis. 73% have positively marked this possibility, 23% have not participated in such activity.

One of the preconditions for the successful development of the doctoral thesis is the successful cooperation of the doctoral student with the supervisor of the doctoral thesis. 93% of respondents have confirmed this, while 7% have indicated fragmented cooperation.

Skills of preparation of scientific articles and presentation of research results are of great importance in approbation of the results of the dissertation. We tried to find out the self-assessment of doctoral students in this field. 54% of the respondents indicated appropriate skills, but 46% pointed to the need to improve skills in the preparation of scientific articles. The assessment of skills for presenting research results is slightly different, 62% indicated the need to improve them, while 38% confirmed appropriate skills. The relatively low assessment of applicants' presentation skills indicates the need to improve them by involving doctoral students more in the implementation of academic work, conducting lectures and seminars for bachelor and master students on the topic of the dissertation and its connection with the study course for a specific audience.

Doctoral students were asked about difficulties in the study process, 43% pointed out difficulties in combining studies and work, 15% - on financial problems in implementing the research, 28% saw difficulties in processing and interpreting the research data. Considering that the theoretical courses include parts I and II of "Multivariate Data Analysis", which provide doctoral students with knowledge in data processing, more applying to normal distribution data, and there is a need to independently learn what is useful, then this problem really exists. The solutions are individual consultations for the processing of the results of the dissertation, also for the inclusion of the presentation of non-parametric methods in the course topics. All doctoral students combine the development of a doctoral thesis with studies, which really is not easy, but they succeeded. Doctoral students acknowledge that doctoral studies are a full-time job and that they must be remunerated accordingly.

Assessing the specifics of the doctoral thesis, including the support required during its development, the issue of the need for two supervisors of the doctoral thesis becomes topical. 46% of respondents said they saw benefits, while 54% said they could not answer or did not see benefits. In general, doctoral theses are supervised by one supervisor, in some cases, there are 2 supervisors (up to 10% of the developed works).

The participation of doctoral students in mobility programmes offered by the university and various

foundations plays an important role in the acquisition of research skills. When interested in the readiness of doctoral students for mobility, 38% gave an affirmative answer. In general, doctoral students successfully participate in mobility activities (see section 2.7), but there is always space for intensification.

Regarding the participation in the competition of projects administered by the Doctoral School, 82% have expressed a desire, while 18% have indicated that they will defend their doctoral theses in the coming months and this invitation is no longer relevant. The call for the 1st project was announced in April 2021, 71% of the applicants for the scientific degree and 6% of the doctoral students have received this grant.

The results of the survey clearly highlight the strengths and the necessary improvements, which would be strongly supported by the grants of the doctoral school, including more targeted involvement of doctoral students in research activities and academic work, which would allow them to strengthen presentation skills.

Results of the **survey of graduates (doctoral degree holders)** summarise the opinion of 10 respondents (33% of doctoral degree holders from 2013-2020). Graduates were asked if they were engaged in research and an affirmative answer (80% of respondents) was received in most cases. It should be noted that the surveyed respondents work in Latvian and foreign research institutes on a daily basis (20%), 40% are employed in universities, including research centres of foreign universities, 30% work in the field of new product development, research projects, business management, and 10% - in training college students.

We asked the graduates how a doctoral degree helps in performing professional duties. The answers were dominated by:

1) ability to see things in a broader context (27%);

2) promotes immersion in an issue or problem (23%);

3) gives a basis for a reasoned reply (23%).

Undoubtedly, 17% of respondents noted that the degree aided in promoting career development. At the same time, we wanted to find out the graduates' thoughts about the programme, its strengths and weaknesses, as well as the competencies that the programme develops. Analysing the answers of the respondents, the following assessment prevailed more often - mathematical processing of research data (40%), presentation of research results (20%) and skills of preparation of scientific articles (20%) are slightly lacking.

The new doctors noted that for the improvement of the programme the implementers of the programme should work more intensively/organize international courses for doctoral students (25%), look for opportunities to attract additional funding for research (25%), involve doctoral students in the implementation of research projects (20%). It should be noted that we wanted to include in the survey the answers of the graduates who defended their doctoral theses in the period from 2015 to 2020, when doctoral students did not have access to ESF financial support mechanisms for doctoral studies. Thus, this financial question is also very clear in the answers. 50% of the respondents were employed in the implementation of the National Research Programme "Sustainability of Agricultural Resources for the Production of Quality and Healthy Food in Latvia" ("AgroBioRes", 2014-2018), the European 7th Framework Programme project EUROLEGUME, which allowed solving the tasks of the dissertation. Only a small number of respondents (10%) received grants from the LLU research programme in the development of the doctoral thesis. The other respondents tried to use the opportunities of the faculty, contacts of the supervisors of the dissertation, the offer/material and technical base of other scientific institutions in the development

of the dissertation, mobility programmes, moreover, there was also significant support for food companies.

We tried to find out how having a doctoral degree helps respondents to solve everyday situations – 60% of the answers were dominated by *easier to solve* answer. Following the progress of the graduates work, we asked about the preparation of joint research projects/publications with the implementers of the study programme realisers. Assessing the employment of the respondents in various institutions, only 50% of the respondents gave an affirmative answer. On a positive note, 80% of respondents follow up on project calls for young researchers, thus continuing their research work.

Respondents had the opportunity to express their thoughts, suggestions, including comments on the content of the programme, the implementers, etc. Analysing them, a SWOT matrix was created, which allows seeing the programme from the point of view of its graduates and students.

Table 2.6.1.

**SWOT matrix**

| **Strengths** | **Weaknesses** |
|---|---|
| Promotes personal growth<br>Promoting critical thinking<br>Competence/recognition in the food sector | Insufficient funding for research<br>Content of separate theoretical study courses and their correspondence to the doctoral study level |
| **Opportunities** | **Threats** |
| Mobility<br>Promotion of international cooperation<br>The doctoral thesis based on the summary of publications | Combining studies with work |

In general, the results of the graduate survey reflected the opinion expressed by several new doctors - ***I came for the knowledge and acquired them***.

**Employer survey**. Considering that 60% of doctoral degree holders work in universities and scientific institutes and hold the positions of assistant professors and leading researchers, then applicants for these positions must meet certain criteria stipulated in the Law on Scientific Activity and the Law on Higher Education Institutions.

Persons with a doctoral degree may be elected to the position of leading researcher (Law on Scientific Activity, Article 26 (3)) and an assistant professor (Law on Higher Education Institutions, Article 32). In addition, 50% of doctoral degree holders' employers (institute management, faculty/department management) are particularly motivating for doctoral studies, seeing the employee's potential. Employers are most often at the same time graduates of this programme – thus holders of the scientific degree, who recognize the programme's contribution to personal growth, international relations, etc.

## 2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.

During the reporting period, students in the doctoral study programme have participated in mobility programmes. ERASMUS mobility opportunities have been used by doctoral students both in the short and long term, through internships at the National Polytechnic Institute of Toulouse (France), the University of Oviedo (Spain), etc. Doctoral students have received Baltic-American Freedom Foundation (BAFF) scholarships for research programmes and internships at the USA research institutes/universities. In total, 3 doctoral students gained internship opportunities in USA by the BAFF scholarship programme during the reporting period. During the study year 2017/2018, one doctoral student did an internship at the University of Minnesota, developing the experimental part of the dissertation. During the study year 2018/2019, another doctoral student continued doctoral dissertation development and acquisition of new analytical methods while doing an internship at the Dairy Innovation Institute at the California Polytechnic State University. During the study year 2019/2020, one doctoral student did an internship at the Centre for Sensory Analysis and Consumer Behaviour, developing a doctoral thesis. In Table 2.7.1. is summarized the mobility of doctoral students.

Table 2.7.1.

**Mobility of students in the programme**

| Year | 2013./2014. | 2014./2015. | 2015./2016. | 2016./2017. | 2017./2018. | 2018./2019. | 2019./2020. |
|---|---|---|---|---|---|---|---|
| Students | 1 | 1 | 1 | 1 | 1 | 2 | 2 |

During the reporting period, foreign doctoral students have completed internships under the guidance of lecturers of the doctoral study programme within the framework of mobility programmes or various scholarship programmes, as well as within inter-university agreements and research projects (e.g., Osmosis project), developing the experimental part or research section. A doctoral student from the University of Helsinki (Finland), using the offer of the Latvian government scholarship programme, gained opportunities to complete an internship in the doctoral study program "Food Science" in 2017/2018. During the study year 2018/2019, a doctoral student from the Technological University of Tajikistan did an internship in the programme, while several times in mobility of various durations, within the framework of ERASMUS and research projects, a doctoral student of Kaunas University of Technology (Lithuania) developed the research section of the dissertation. Also, a doctoral student from the National Polytechnic Institute of Toulouse (France) has developed a research section at the Faculty of Food Technology. In 2020, a doctoral student from the University of Bari Aldo Moro (Italy) completed an internship at the faculty under the ERASMUS programme.

Table 2.7.2.

**Mobility of foreign students**

| Year | 2013./2014. | 2014./2015. | 2015./2016. | 2016./2017. | 2017./2018. | 2018./2019. | 2019./2020. |
|---|---|---|---|---|---|---|---|
| Students | 1 | | 1 | 1 | 1 | 1 | 1 |

The research work done during the mobility results in a certain amount of credit points, in accordance with the intended purpose of the research work, as well as a draft of publications.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

**Financial provision**. The sources of funding for the doctoral study programme are the state budget funds intended for the implementation of the study programme; funding for the implementation of scientific infrastructure; science base funding; LLU research programme grants; ERDF funding for the improvement of the material base.

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science, the Ministry of Agriculture and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for 2020 stipulates that the basic costs of one study place are 1519.98 EUR, the study level coefficient for the doctoral programme is 3 and the social security of the study place for the doctoral programme is 2034 EUR, the study cost coefficient for the doctoral study programme "Food Science" in the thematic area of education is 1.8 (the Cabinet of Ministers Regulation No. 994/2006 “Procedures for Financing Higher Education Institutions and Colleges from the State Budget”), and the cost per student in this programme is 10235.07 EUR.

Every year, the Senate of LLU approves the distribution of revenues and expenditures of the LLU General Budget, prepared in accordance with the Saeima annual law "On the State Budget" and the LLU Rector's Order "On LLU Budget Planning". The control and audit of the general budget is performed by a sworn auditor, whose opinion and report are reviewed and approved by the Senate of LLU.

Before approving the distribution of LLU general budget revenues and expenditures in the Senate, it is reviewed, discussed and approved by the Working Group on Resource Use and Development, which consists of Rector, Chancellor, Vice-Rectors, Deans of all faculties, Head of Resource Accounting Centre/Chief Accountant, Head of Financial Planning, Chief Economists, Chief specialists in real estate and legal issues.

The distribution of the total budget of LLU is formed by the estimates of structural units/faculties, where costs are estimated by types of expenditure.

In 2020, the share of costs of the doctoral programme "Food Science" consisted of:

- remuneration - 74%;
- scholarships - 8%;
- goods and services 17%, incl. utilities 6%;
- share capital formation 1%.

State funding by years:

In 2019, within the framework of the tripartite agreement on state funding for the programme, the cost of one study place was 1518.98 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the education thematic area coefficient for the programme in the thematic area of education was 1.8, the cost per student in the programme was EUR 10234.47.

In 2018, within the framework of the tripartite agreement on state funding for the programme, the cost of one study place was 1458.51 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the coefficient for the programme in the thematic area of education was 1.8, the cost per student in the programme was EUR 9906.60.

In 2017, within the framework of the tripartite agreement on state funding for the programme, it was determined that the cost of one study place is 1393.33 EUR, the study level coefficient is 3 and the social security of the study place is 2034 EUR, the coefficient for the programme in the thematic area of education is 1.8, the cost per student in the programme is EUR 9557.40.

Within the framework of the 2016 tripartite agreement on state funding for the programme, the cost of one study place was 1333.11 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the coefficient for the programme in the thematic area of education was 1.8, the cost per student in the programme was 8113.79 EUR (financial provision only 84.45%).

In 2015, within the framework of the tripartite agreement on state funding for the programme, the cost of one study place was 1333.11 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the coefficient for the programme in the thematic area of education was 1.8, the cost per student in the programme was 8114.16 EUR (financial provision 84.46%).

In 2014, within the framework of the tripartite agreement on state funding for the programme, the cost of one study place was 1333.11 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the coefficient for the programme in the thematic area of education was 1.8, the cost per student in the programme was 8061.53 EUR (financial provision 83.72%).

In 2013, within the framework of the tripartite agreement on state funding for the programme, the cost of one study place was 1333.36 EUR, the study level coefficient was 3 and the social security of the study place was 2034 EUR, the thematic area coefficient of education was 1.8, the cost per student in the programme was 7855.58 EUR.

The **material-technical provision** of the study programme is able to ensure an efficient study process, including the development of a doctoral thesis in the chosen topic. Doctoral students have the opportunity to study independently and communicate with lecturers electronically using the e-environment. Study materials are placed in the e-environment, in the e-studies created by LLU, which are available on the website https://estudijas.llu.lv/?lang=en

For the preparation of the independent work, including the development of the theoretical review of the doctoral thesis, the LLU Fundamental Library offers a wide range of scientific literature and various databases https://llufb.llu.lv/en The electronic catalogue of the Fundamental Library contains information on more than 3,500 publications in the field of food and beverage technology. There are various options for searching for information. Databases created by the LLU Fundamental Library: "Electronic catalogue of the LLU Fundamental Library", "Publications of the Academic and Research Staff of the LLU", "Theses Presented at the LLU", "Journal and Conference Articles of Latvia University of Life Sciences and Technologies". Subscribed databases, e-journals, e-books: AGRIS, CABI abstract, CABI Animal Health and Product Compendium, CABI Crop Protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO e-book Academic Collection, EBSCO database, newspaper library, Letonika, ScienceDirect journals, SCOPUS, Escival, Web of Science, Wiley Online. The library's holdings in thematic areas (%) are as follows: agriculture (38%), natural sciences (10%), social sciences (24%), engineering (19%), other sciences (9%) and Internet resources (encyclopaedias, dictionaries), information search engines and portals (CiteseerX

Scientific Literature Digital Library and Search Engine, Elsevier, Springer link, etc.). From June 11, 2012, the LLU Fundamental Library provides access to subscribed databases outside the LLU network with the EZproxy tool, using the LLU Information Systems or e-learning user account.

In August 2015, the Study and Science Centre of the Faculty of Food Technology of LLU was put into operation. Thanks to ERDF projects No. 2010/0119 / 3DP / 3.1.2.1.1. / 09 / IPIA / VIAA / 009 "Modernization of LLU study infrastructure" (2010-2015) and No. 2011/0040 / 2DP / 3.1.2.1.1. / 11 / IPIA / VIAA / 022 "National Importance Research Centre for the Utilisation of Agricultural Resources and Food" (2012-2015), a new building was erected with a modern study and research base for food technology studies and research. The education of doctoral students is mainly implemented by the Faculty of Food Technology. The following laboratories and pilot plants are at the disposal of the faculty for the development of doctoral theses: Laboratory of Food Processes, Laboratory of Food Packaging, Laboratory of Sensory Evaluation, Microbiology Laboratory, Biotechnology Laboratory, and milk, meat, fruit-vegetable, and grain processing pilot plants. Laboratories and pilot plants are provided with modern equipment, small-scale technological equipment for food development and quality testing. Doctoral students can use analytical equipment (chromatographs, mass spectrometers, viscometers, analysers of structural properties of food, fat, protein, fibre, including dietary fibre, flour analysers, milk analyser) and technological equipment (dryers of various constructions: spray dryer, microwave and freeze-dryer; high-pressure processing equipment; spray dryer with particle microencapsulation capabilities; autoclaves, including back-pressure; flow pack packaging equipment), technological equipment for meat production (thermal chambers, homogeniser, etc.), technological equipment for milk processing (for the production of cheese, butter, condensed milk products), membrane equipment module: for the implementation of ultrafiltration, microfiltration, reverse osmosis, nanofiltration; technological equipment for grain processing (mills, ovens, extruders), bioreactor complex for simulation of the gastrointestinal tract (implementation of *in vitro* process); system for input and analysis of sensory evaluation results.

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

For research, doctoral students also have access to the material and technical base of LLU scientific laboratories (Department of Smart Technologies of Biotechnology Scientific Laboratory, which is equipped with the modern equipment in LLU - 3D digital light microscope, confocal laser scanning microscope, supercritical $CO_2$ extraction and chromatography-mass spectrometry system) and LLU institutes (Institute of Horticulture, Institute of Agricultural Resources and Economics).

In the period from 2012 to 2015, LLU in cooperation with the Scientific Institute of Food Safety, Animal Health and Environment "BIOR", the Institute of Horticulture and the Institute of Agricultural Resources and Economics, etc. institutions implemented the ERDF project No. 2011/0040 / 2DP / 2.1.1.3.1. / 11 / IPIA / VIAA / 002 "National Importance Research Centre for the Utilisation of Agricultural Resources and Food", within the framework of which scientific institutions improved their material and technical base, purchased new, unique technological and analytical equipment that can be used for research within the framework of the cooperation agreement.

Implementing joint projects with other Latvian scientific institutions and universities, doctoral students have the opportunity to use the material and technical base of these institutions for research (e.g., the Institute of Microbiology and Biotechnology of the University of Latvia, etc.).

In addition, within the framework of mobility, especially ERASMUS, doctoral students have access to the material-research base of cooperation universities for the implementation of research.

# III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

In total, 23 teaching staff members were involved in the implementation of the programme during the reporting period (see section 4.2). The dynamics of the number of teaching staff is summarized in Table 4.1.1.

Table 4.1.1.

**Teaching staff in the implementation of the study programme**

| Position | 2013./2014. | 2014./2015. | 2015./2016. | 2016./2017. | 2017./2018. | 2018./2019. | 2019./2020. |
|---|---|---|---|---|---|---|---|
| Professor | 8 | 8 | 7 | 8 | 7 | 8 | 7 |
| Associate professor | 5 | 6 | 6 | 6 | 4 | 2 | 2 |
| Assistant professor | 4 | 2 | 1 | 2 | 4 | 6 | 7 |
| Leading researchers | 3 | 2 | 1 | - | - | - | - |
| Lecturers | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

During the reporting period, there have been changes in the composition of the teaching staff, as 3 professors have terminated their employment at the university. The teaching staff involved in the programme have been elected to a higher position (assistant professors, associate professors or professors). In total, such changes have affected 4 professors, 3 associate professors and 2 assistant professors. The proportion of assistant professors in the study program has increased during the study year 2017/2018. Assistant professors (at the same time young scientists) supervise doctoral theses alongside experienced colleagues (professors and associate professors). The core of the teaching staff in the implementation of the study programme has not changed significantly during the reporting period. In order to improve the skills of new colleagues (assistant professors), 2 supervisors are invited to supervise several doctoral theses. Although the supervisors are selected on the basis of their competence and knowledge in a certain field of research, the work in tandem only promotes progress and purposeful management of the doctoral thesis.

Changes in the qualification of teaching staff ensure the corresponding quality of the study programme.

During the reporting period, 30 doctoral theses were developed and successfully defended (they were supervised by 18% assistant professors, 10% associate professors, 16% leading researchers and 56% professors), which confirm the quality of studies, its continuous improvement and analysis of achievements.

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

In accordance to the rules of Section 55 (Subsection 1, Point 3) of the Law on Higher Education Institutions, *not less than five persons with a doctoral degree must participate in the implementation of the academic doctoral study programme, of which at least three are experts of the Latvian Council of Science (LCS) in the respective field*. The relevant field of the doctoral study programme "Food Science" is other engineering sciences and technologies, including food and beverage technologies. The compliance of the qualification of the teaching staff involved in the doctoral study programme in the reporting period with the conditions for the implementation of the study programme and the requirements of regulatory enactments is summarized in Table 4.2.1.

Table 4.2.1.

**Qualification of teaching staff**

| Position | Number of persons | % of involved in the program | Number of LCS experts | % of involved in the program |
|---|---|---|---|---|
| Professors | 11 | 48 | 10 | 43 |
| Associate Professors | 4 | 18 | 4 | 18 |
| Assistant Professors | 7 | 30 | 3 | 13 |
| Lecturers* | 1 | 4 | - | - |
| **Total** | **23** | **100** | **17** | **74** |

* participate in the acquisition of knowledge of a foreign language (German)

Three of the professors involved in the doctoral study programme have been granted LCS expert status in another field of science. The qualification of the teaching staff complies with the conditions for the implementation of the programme and the requirements of regulatory enactments. In addition, LLU Regulation "Regulations for Doctoral Studies" Section 3.3. (approved by the LLU Senate Decision No. 8-201 of November 11, 2015) emphasizes that *the doctoral study programme is implemented by the highly qualified academic and scientific staff of LLU*.

The doctoral study programme envisages theoretical courses, in which lecturers educate doctoral students in current scientific theories and findings, diversity of research methods and justification of their use, research data processing possibilities and presentation of results, preparation of scientific articles that promote doctoral students' achievement of study results. The knowledge and competence of the teaching staff is the basis for achieving these results in this area. Supervisors of doctoral theses develop doctoral students' independence to carry out research work, summarize

results, defend their achievements, and motivate them to go deeper, search, explain research results, promote the achievement of study results, especially competencies, with their example and authority. Teachers' knowledge, work on research projects, publication of scientific results, reports at conferences, congresses, symposia, etc. is the basis for achieving these results in this area.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

The number of publications of the academic staff involved in the implementation of the doctoral study programme in the reporting period is summarized in Table 4.3.1.

Table 4.3.1.

**Publications of the academic staff (2013-2020)**

| Publications | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| Total SCOPUS / WoS | 38 | 52 | 59 | 56 | 113 | 93 | 104 | 55 |
| In SCOPUS / WoS journals | 22 | 4 | 27 | 35 | 43 | 58 | 21 | 33 |

Although the number of publications varies greatly from year to year, the number of publications indexed in journals of SCOPUS and WoS databases has steadily increased during this period. The journals in which manuscripts are published are *Agronomy Research (Q3), Proceedings of the Latvian Academy of Science (Q3), Food Chemistry (Q1), Applied Microbiology & Biotechnology (Q1), Acta Agriculturae Scandinavica (Q3), Innovative Food Science and Emerging Technologies (Q1), Nutrients (Q1), Current Nutrition and Food Science (Q3), Polish Journal of Food & Nutrition (Q2), Medicine (Q3), Foods (Q2), European Food Research and Technology (Q1), Acta Horticulturae (Q4), Journal of Food, Agriculture and Environment (Q3), Journal of Hygienic Engineering (Q4), International Breastfeeding Journal (Q1), Journal of Molecular Structure (Q2), Nutrition and Food Science (Q3), Public Health (Q1)*.

On a positive note, the proportion of publications in journals (Q2) has increased in recent years, including by doctoral students.

The list of the most important publications is summarized in the Annex.

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

During the reporting period, the implementers of the doctoral study programme have participated in the implementation of the 7th Framework Program projects, Norwegian Financial Mechanism projects, National Research Program and its projects, European Agricultural Fund for Rural Development projects, COST activities, CI&DETS Research Centre projects, European Maritime and Fisheries Fund projects, LLU research projects, market-oriented projects, etc. The academic staff has been in the status of project managers or main executors. The projects implemented during the reporting period are summarized in the annex *Implemented projects*.

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

The academic staff involved in the implementation of the doctoral study programme participates in the implementation of national and international projects, for example:

1. The state research programme "Sustainability of Agricultural Resources for the Production of Quality and Healthy Food in Latvia (AgroBioRes, 2014-2018)" was led by one of the lecturers involved in the implementation of the program, but projects were implemented by 66% of the lecturers of the doctoral study programme;
2. FP7 KBBE 2013-7-613781 "Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed (EUROLEGUME)" (2014-2017), was implemented by 24% of lecturers;
3. The EEA Norwegian Financial Mechanism project NFI/R/2014/11 "Innovative approach to hull-less spring cereals and triticale use from human health perspective" (2015-2016) was led by one of the lecturers involved in the implementation of the program and implemented by 38% of lecturers;
4. COST Action CA18101 project "Sourdough biotechnology network towards novel, healthier and sustainable food and bioprocesses" (2018-2021) is implemented by 9% of the lecturers of the doctoral study programme;
5. CI & CIDETS Research Centre project "Psycho-social motivations associated with food choices and eating practices " (2016-2019) was implemented by 9% of the lecturers of the doctoral study programme;
6. ERANET project ERASysAPP "Systems biology platform for the creation of lean-proteome *Escherichia coli* strains" (2015-2018) was implemented by 4.5% of the lecturers of the doctoral study programme;
7. European Maritime and Fisheries Fund project 16-00-FP1101-000005 "Production of structured fish forcemeat from Baltic sea fish and its use in fish products" (2017-2018) was implemented by 42% of the lecturers of the doctoral study programme;
8. and others (see detailed list of projects in section 4.4).

Doctoral students also participate in the implementation of projects, by developing their doctoral theses. The competencies acquired in the development of projects are the basis for the supervision of doctoral theses in a certain field of food and beverage technologies science and the offer of doctoral thesis topics.

For example, the findings of the EUROLEGUME project provided an opportunity to develop the following doctoral theses "Effect of advanced processing methods on the quality of pulse spreads during shelf-life" and "The use of legumes in the production of extruded food products". The competences obtained in the state research programme projects provided the opportunity to develop such doctoral theses as "Suitability of cereals cultivated in Latvia for whole-grain pasta production" and "Potato processing by-product evaluation for microencapsulated phenolic compound production". The findings of the Norwegian Financial Instrument projects on composition, properties, application in the production of cereal products of hulled barley and other cereals, provided opportunities to develop the doctoral thesis “Investigation of gluten-free flour and its products".

Also, the knowledge gained in the implementation of projects has given lecturers opportunities to improve their skills at a higher level in the implementation of such courses included in the doctoral study programme as "Research Methodology in Food Science", "Preparation of Scientific Papers", etc.

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

The theoretical part of the doctoral study programme includes the compulsory courses "Research Methodology in Food Science", "English for Research Professionals" or "German for Research Activities", “Food and Beverage Technologies" and “Course in the research direction", students are also offered elective (free choice) study courses "Multivariate Data Analysis I and II" and "Preparation of Scientific Papers".

In the implementation of the study courses the lecturers closely cooperate among themselves and also “indirectly” with the supervisors of doctoral thesis (see Figure 4.6.1.). In the acquisition of the course "Research Methodology in Food Science", doctoral students must evaluate, analyse and present the methods which will be used in the development of the doctoral thesis, and argue their choice. The course includes seminars in which supervisors of doctoral thesis and other implementers of doctoral study courses, including professors of foreign universities (in 2019/2020 and 2020/2021), participate, which allows the doctoral student to better understand, clarify the role of research methods at the research level, and promotes a wider/critical view of the selected parameters. The study courses "Multivariate Data Analysis I" and " Multivariate Data Analysis II" develop students' skills and competencies in research data processing, choice of used methods, data interpretation possibilities, etc. The course is implemented by two lecturers in cooperation with each other. After mastering the course, close feedback is maintained for the doctoral student with the implementer(s) of the study course. In-depth acquisition of a foreign language related to research issues is planned in doctoral studies, which strengthens the doctoral student's foreign language skills, their application in scientific work, including the presentation of results. A member of the "Food and Beverage Technologies" Promotion Council participates in the assessment of foreign language skills (exam). In the elective course "Preparation of Scientific Papers" doctoral students acquire knowledge, skills and competencies in preparation of scientific articles, practically prepare an article for a certain edition in consultation with the supervisor, and analyse the manuscript in detail with the course lecturer (strengths, weaknesses, terms, research plan,

presentation, discussion, conclusions, article design, scientific quality). Such cooperation mechanism is the basis in the implementation of any study course (see Figure 4.6.1).

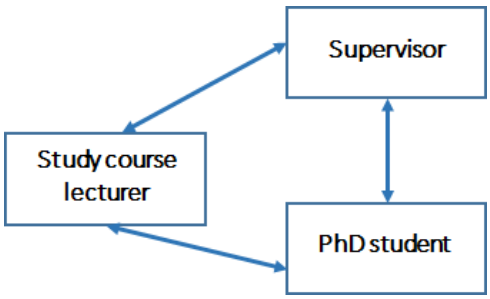


Fig. 4.6.1. Cooperation mechanism.

Acquisition of study courses follows the succession of knowledge, starting with "Research Methods in Food Science", "English for Research Professionals" or "German for Research Activities" and "Multivariate Data Analysis (I and II)", ending with "Food and Beverage Technologies" and "Course in the research direction". The last two courses are organized in the form of a doctoral examination, with the participation of members of the Promotion Council and other interested parties.

The ratio of students to teaching staff at the time of preparing the report (2021) is 11.4.

# Annexes

| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
|---|---|---|
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | Annex 5. Students' statistics_FS.pdf | 5. pielikums. Studējošo statistika_Pārtikas zinātne.pdf |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | | |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | Annex 8. The mapping of doctoral study programme Food Science study courses.xlsx | 8. pielikums. Pārtikas zinātnes doktora studiju programmas kursu kartējums.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | Annex 9. Study plan_Food Science.pdf | 9. pielikums. Studiju plāns_PZ_LV.pdf |
| Descriptions of the study courses/ modules | Annex 10. Study course description Food Science.pdf | 10. pielikums. Studiju kursu anotācijas_Pārtikas zinātne.pdf |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | Doktora_diploms_Pārtikas zinātne_EN (2).pdf | Doktora_diploms_Pārtikas zinātne_LV (1).pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Sample (or samples) of the study agreement | 18_Study_Agreement_LV_EN_2020.pdf | 18_Studiju_ligums.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | Dok_stud_progr_Pārtikas zinātne_AIP atzinums_EN.docx | dok_stud_progr_Pārtikas zinātne_AIP atzinums.edoc |

# Food Science (45541)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Food Science* |
| Education classification code | *45541* |
| Type of the study programme | *Academic master study programme* |
| Name of the study programme director | *Tatjana* |
| Surname of the study programme director | *Ķince* |
| E-mail of the study programme director | *tatjana.kince@llu.lv* |
| Title of the study programme director | *Dr.sc.ing.* |
| Phone of the study programme director | *+37129882160* |
| Goal of the study programme | *To educate creatively thinking, decisive higher-level specialists for the development and competitiveness of food science and production in Latvia and the European Union, providing them with comprehensive knowledge in food production and research skills for scientific and academic work.* |
| Tasks of the study programme | *to promote students' interest in solving problems related to the food industry by educating them about a modern, responsible and capable personality who is able to act and make decisions independently;*<br><br>*to give an understanding of the theoretical foundations of the field of food science, being able to analyse and evaluate the results of scientific work and substantiate their significance in the improvement of production processes and / or development of new products;*<br><br>*to prepare specialists for the food industry and scientific-research, education, state supervision and administration institutions;*<br><br>*to develop preconditions for students to perform independent research and motivation for doctoral studies or promotion of self-education.* |

| | |
|---|---|
| Results of the study programme | *Knowledge:*<br><br>*is able to demonstrate in-depth knowledge and understanding of the latest trends in food science, which is the basis for creative thinking and research;*<br><br>*demonstrates an understanding of food design and quality assurance conditions in product development;*<br><br>*is able to demonstrate knowledge in the field of food science, analysing and evaluating the results of scientific research, substantiating their significance in the development of production technologies or products;*<br><br>*is able to demonstrate the acquired theoretical and practical knowledge by choosing and applying various scientific research methods in solving specific issues.*<br><br>*Skills:*<br><br>*is able to independently use theory, methods and skills in solving problems, to substantiate the parameters characterizing the quality of food products;*<br><br>*is able to choose and apply various scientific research methods in solving issues relevant to the field;*<br><br>*is able to analyse and creatively evaluate the results of the performed research work, substantiating their significance in the development of production technologies or products;*<br><br>*is able to take responsibility for the results of the work of scientific groups and their analysis, to do business, to implement innovations in the food industry.*<br><br>*Competencies:*<br><br>*is able to independently formulate and critically analyse complex scientific and professional problems in food science, substantiate the decisions made;*<br><br>*is able to integrate knowledge from different fields, contribute to the creation of new knowledge and the development of research methods;*<br><br>*is able to develop scientifically based food production technologies, improve the food quality system and operation for the production of consumer safe products.* |
| Final examination upon the completion of the study programme | *Master's thesis* |

# Study programme forms

**Full time studies - 2 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *2* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *80* |
| Admission requirements (in English) | *Bachelor's degree or 2nd level professional higher education (or equivalent higher education) in food quality and innovations, food technology, catering and hotel management, life sciences. Knowledge of English at least at B2 level is a mandatory requirement for a study program implemented in English.* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Master Degree of Engineering in Food and Beverage Technologies* |
| Qualification to be obtained (in english) | *-* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Full time studies - 2 years - english**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *2* |
| Duration in month | *0* |
| Language | *english* |
| Amount (CP) | *80* |
| Admission requirements (in English) | *Bachelor's degree or 2nd level professional higher education (or equivalent higher education) in food quality and innovations, food technology, catering and hotel management, life sciences. Knowledge of English at least at B2 level is a mandatory requirement for a study program implemented in English.* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Master Degree of Engineering in Food and Beverage Technologies* |
| Qualification to be obtained (in english) | *-* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

**1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction**

The study program "Food Science" was approved by the Senate of the Latvia University of Agriculture (now Latvia University of Life Sciences and Technologies) (LLU) on March 10, 1999 by decision No. 265. In 2004, the study program was accredited for six years. The approval egarding the possibility of implementing the academic master's study program "Food Science", which is planned for less than 250 full-time students, was received from the Council of Higher Education (No. 1.10 / 23) on April 23, 2020, where according to the Law on Higher Education (Section 55, second part), academic study programs (bachelor's, master's and doctoral study programs), which are presented to less than 250 full-time students, may be implemented and less than five university professors and associate professors may participate in the implementation of the compulsory and limited elective part of these programs.

The field of study Production and processing, in accordance with the documents certifying accreditation (Accreditation sheet of the field of study No. 86 / 05.06.2013) is accredited until June 4, 2019. In accordance with the amendments to the Law on Higher Education Institutions approved on January 1, 2019, the term of accreditation of field of study Production and Processing has been extended until December 31, 2021.

The content of the academic master's study program Food Science for ensuring competitiveness has been updated several times since 2013.

**2014/2015 and 2015/2016 study years**

Taking into account the proposals expressed by graduates and master students, as well as in accordance with the LLU “Regulations for Development of Study Course and Practice Documents” (approved by the Study Council Decision No. 02.1-25.02 / 6 of May 29, 2013 and the Study Council Decision No. 02.1-25.02 / 7) in 2014/2015 study years the following changes in the study year plan were made.

2014/2015 study year:

1. the implementation of the study course “Research Metrology in Food Science” (3 CP) was started, integrating also the study course Metrology (1 CP).
2. study courses “Food Safety” (3 CP) and “Toxicology” (2 CP) were combined in a block, specifying the content of the courses, and further implemented as “Food Safety I” (3 CP, 1st semester) and “Food Safety II” (2 CP, 2nd semester).
3. the implementation of the study course “Food Law” (2 CP) was started, increasing the volume of the existing study course “Food Circulation and its Legislation” (1 CP) and specifying the name.
4. study courses “Functional properties of food” (3 CP) and “Genetically modified food” (3 CP) were combined, implementation of the study course “Novel food” (5 CP) was started.
5. the study course “Innovative in Technological Equipment” (2 CP) was excluded from the

study program, which in terms of content was not appropriate for the study program.
6. two new study courses “Food aroma” (3 CP) and “Food allergies and intolerances” (3 CP) were created, according to the content, goals and tasks of the study program.
7. the study courses “Sensory Evaluation Methods of Food Products” (2 CP) and “Sensory and Consumer Science” (2 CP) were combined, starting the implementation of the study course “Sensory and Consumer Science” (3 CP).
8. the amount provided for the development of the master's thesis was adjusted to 20 CP instead of the existing 25 CP.

Evaluating the students' proposals and analysis of the content of similar study programs implemented abroad, the study course “Microorganism Identification” (2 CP, 2nd semester) was excluded from the master's study program plan and two new courses PārZ5025 “Food aroma” (3 CP) and PārZ5020 “Food Allergies and Intolerances ”(3CP) were included, according to the content, goals and objectives of the master's program.

After the changes, the total amount of CP in the study program is constant - 80 CP.

Based on the decision of the master's examination commission, the master's thesis is evaluated with a mark starting from 2015/2016 study year.

Until 2015/2016, the study program was implemented in Latvian, but the active activity of LLU in the international environment and the purposeful process of internationalization of studies at LLU, identifying the interests and needs of foreign students, facilitated the implementation of the master's study program Food Science in English (Accreditation sheet No. 2020/27, 25.03.2020). The decision of LLU Faculty of Food technology to admit foreign students was based on the following considerations:

1. 10-12 Erasmus exchange students study at the faculty every year;
2. lecturers have accumulated sufficient experience for teaching study courses in English to foreign students;
3. graduates are in demand specialists in the labour market;
4. a unique program is offered, which is not available in other Latvian higher education institutions.

**2016/2017 study year**

No changes were made to the study plan.

**2017/2018, 2018/2019 and 2019/2020 study years**

No changes were made to the study plan.

Starting from 2018, LLU is implementing the project "Improvement of Latvia University of Agriculture Management" supported by the European Structural Funds (No. 8.2.3.0/18/A/009), the aim of which is to improve the quality of LLU study program content and ensure better use of available resources. The project has evaluated the program from the point of view of both foreign experts and industry experts. The experts have acknowledged that the structure of the study program fully corresponds to the achievable degree, **but** the program includes too many different study courses, that can reduce the level of topicality of the program. Little attention has been paid to the deeper acquisition of various study courses, recommending to change the structure of the program, the content of the study program and the way of implementation.

**Changes starting from 2020/2021 study year:**

1. The study course “Nutrition Development Tendencies” (Medi6002; 2 CP) has been replaced by the study course “Nutrition” (PārZ503; 2 CP), updating the content of the study course,

achievable results and evaluation criteria.

2. The study course “Natural Substances in Food Systems II” (PārZ4035, 3.5 CP) has been replaced by the study course “Chemistry of Natural Compounds” (Ķīmi5006, 3 CP), updating the content of the study course, achievable results and evaluation criteria.
3. Study courses “Natural substances in food systems I” (PārZ4034, 1.5 CP) and “Regulation of biochemical processes” (PārZ6016, 2 CP) have been combined , creating a new study course “Food biochemistry” (PārZ5034, 3 CP), updating the content of the study course, the results to be achieved and the evaluation criteria.
4. A new study course “Food Biotechnology” (PārZ5035, 2 CP) has been developed.
5. Study courses “Food Product Development” (PārZ5019, 2 CP) and “Sensory and Consumer Science” (PārZ6022, 3 CP) have been combined, creating a new study course “Food Design” (PārZ5036, 4 CP), updating the content of the study course, achievable results and evaluation criteria.
6. Study courses “Food Safety I” (PārZ5023, 3 CP) and “Food Safety II” (PārZ5027, 2 CP) have been combined, creating a new study course “Food Safety” (PārZ5033, 5 CP).

Comparing the existing study program with similar study programs implemented in foreign universities and taking into account the experience of foreign universities in the implementation of international study programs (University of Helsinki “Master in Food Science”; University of Turku “Food Development”, Bayreuth University “Food Quality & Safety”) studies are realized in modules (see the list of study courses in the appendix) starting from study year 2020/2021.

**1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

The largest number of enrolled students was observed in study years 2016/2017, 2017/2018 and 2020/2021 (see Table 1.2.1), which is mainly explained by changes in the content of study courses (development of new study courses, improvement of study course content) and changes in the type of study course implementation (implementation of study courses in the modular system). In general, the number of students increased from 2012/2013 to 2017/2018 study years, which testifies to the topicality of the study program, competitiveness and purposeful improvement of the program content for modern society.

Table 1.2.1

**Number of matriculated and ex-matriculated students**

| Study year | Number of enrolled students | | | Number of graduates | | Student dropout |
|---|---|---|---|---|---|---|
| | Total | Including budget | Starting studies later | Total | Including foreign students | |
| 2012/2013 | **15** | 12 | 0 | **9** | | 5 |
| 2013/2014 | **17** | 14 | 0 | **9** | | 5 |
| 2014/2015 | **20** | 20 | 0 | **10** | | 7 |
| 2015/2016 | **20** | 19 | 0 | **16** | | 5 |
| 2016/2017 | **23** | 20 | 0 | **13** | 1 | 15 |
| 2017/2018 | **22** | 18 | 2 | **16** | 1 | 5 |
| 2018/2019 | **12** | 12 | 0 | **12** | | 10 |
| 2019/2020 | **17** | 16 | 0 | **14** | 5 | 17 |
| 2020/2021 | **27** | 21 | 0 | **9** | | 5 |

A significant drop in enrolled students was observed in study year 2018/2019 , which is mainly explained by the general demographic situation in the country, also a smaller number of undergraduates who are potential applicants for the study program.

A large drop-out rate of students was observed in study years 2016/2017; 2018/2019 and 2019/2020 . During the study years 2016/2017 and 2018/2019, it was related to the termination of studies of some foreign students for several reasons (study difficulties, inability to combine studies with professional work, the main goal of students did not study, but job opportunities in Europe). In turn, the drop-out rate of Latvian students was mainly related to the students' problems in combining studies with professional job and the difficulty of the program. During the academic year 2019/2020 , the drop-out rate of students was mainly related to the consequences of the Covid19 pandemic, when students were unable to adapt to distance learning, this type of study implementation was not acceptable for their requirements.

Students have taken academic leave during their studies (see Table 1.2.2), the main reasons being related to personal or students' family problems.

Table 1.2.2

**Distribution of the number of students by courses**

| Study year | Course | | Academic leave | Budget | Self-financing *(Latvian students)* | Self-financing *(foreign students)* | Total |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | | | | | |
| 2012/2013 | 14 | 11 | 0 | 22 | 3 | | **25** |
| 2013/2014 | 18 | 11 | 1 | 27 | 3 | | **30** |
| 2014/2015 | 21 | 13 | 2 | 34 | 2 | | **36** |
| 2015/2016 | 21 | 18 | 1 | 38 | | 2 | **40** |
| 2016/2017 | 23 | 14 | 5 | 38 | | 4 | **42** |
| 2017/2018 | 19 | 14 | 1 | 32 | | 2 | **34** |
| 2018/2019 | 24 | 14 | 1 | 33 | | 6 | **39** |
| 2019/2020 | 16 | 14 | 4 | 28 | | 6 | **34** |
| 2020/2021 | 24 | 10 | 3 | 31 | | 6 | **37** |

The first foreign students were admitted during the study year 2015/2016. In the following study years, students from the Netherlands, Macedonia, India, Azerbaijan and Uzbekistan have graduated from the study program Food Science. Currently, foreign students from India, Sri Lanka, Kyrgyzstan, Uzbekistan and Cameroon are studying in the study program (Figure 1.2.1).

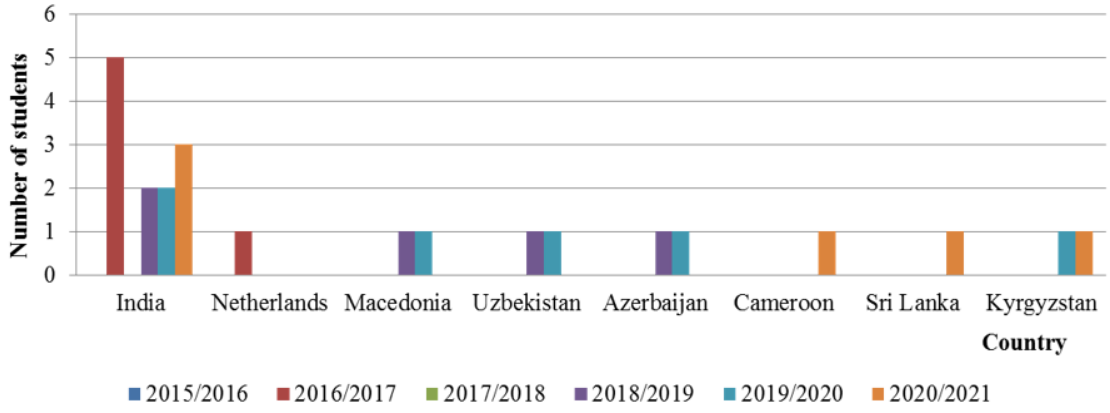


Fig. 1.2.1 Distribution of the number of foreign students by study years

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.**

The goals of the study program are in line with the mission of Latvia University of Life Sciences and Technologies and are focused on the preparation of the highest level specialists for the food industry. The vision of the future of the study program is implemented taking into account the opinion of students, employers, professional organizations and regional interests.

Degree to be awarded - Master Degree of Engineering (Mg.sc.ing.) in Food and Beverage Technologies is in accordance with the nomenclature of science in Latvia, and is closely related to the content of the study program, results to be achieved, topics of master's theses to be developed, research objects the products obtained from them, as well as the processes and equipment necessary for their development.

The **aim** of the academic master's study program "Food Science" is: to educate creatively thinking, decisive higher-level specialists for the development and competitiveness of food science and production in Latvia and the European Union, providing them with comprehensive knowledge in food production and research skills for scientific and academic work.

**Tasks** of the study program:

- **to promote** students' interest in solving problems related to the food industry by educating them about a modern, responsible and capable personality who is able to act and make decisions independently;
- **to give an understanding** of the theoretical foundations of the field of food science, being able to analyse and evaluate the results of scientific work and substantiate their significance in the improvement of production processes and / or development of new products;
- **to prepare** specialists for the food industry and scientific-research, education, state supervision and administration institutions;
- **to develop preconditions** for students to perform independent research and motivation for doctoral studies or promotion of self-education.

**Results** of the study program:

*Knowledge:*

- is able to demonstrate in-depth knowledge and understanding of the latest trends in food science, which is the basis for creative thinking and research;
- demonstrates an understanding of food design and quality assurance conditions in product development;
- is able to demonstrate knowledge in the field of food science, analysing and evaluating the results of scientific research, substantiating their significance in the development of production technologies or products;
- is able to demonstrate the acquired theoretical and practical knowledge by choosing and applying various scientific research methods in solving specific issues.

*Skills:*

- is able to independently use theory, methods and skills in solving problems, to substantiate the parameters characterizing the quality of food products;
- is able to choose and apply various scientific research methods in solving issues relevant to the field;
- is able to analyse and creatively evaluate the results of the performed research work, substantiating their significance in the development of production technologies or products;
- is able to take responsibility for the results of the work of scientific groups and their analysis, to do business, to implement innovations in the food industry.

*Competencies:*

- is able to independently formulate and critically analyse complex scientific and professional problems in food science, substantiate the decisions made;
- is able to integrate knowledge from different fields, contribute to the creation of new knowledge and the development of research methods;
- is able to develop scientifically based food production technologies, improve the food quality system and operation for the production of consumer safe products.

Applicants for the academic master's study program "Food Science" are persons who have obtained a bachelor's degree or higher professional education, which gives the right to continue studies in the master's program. Graduates of the Latvia University of Life Sciences and Technologies undergraduate study programs "Food Science", "Food Quality and Innovations" and "Food Technology" receive 2 additional points in the competition. Foreign students have at least B2 level of English language skills.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master’s and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The planning, organization and implementation of the study process of the academic master's study program Food Science takes place in accordance with the Constitution of the Republic of Latvia, the Law on Education, the Law on Scientific Activity and the Constitution of the Latvia University of Life Sciences and Technologies.

The content and implementation of the study program ensures sustainable development of the study program, corresponds to the four main goals of higher education (solving the tasks of personal, democratic society and science development, observance of labour market requirements). The fact that Latvia needs academically educated specialists in the vast field of food production and in accordance with the requirements of the labour market was taken into consideration when developing this master's study program,

Evaluating the current activities of the Faculty of Food Technology, it should be emphasized that all efforts have been focused on providing quality education to master students of food science, their motivation for the development of research work. The content of study courses is subordinated to the current field, for example, with 2014/2015 the study course "Food Allergy and Intolerance" is implemented in the study year program, clearly demonstrating the topicality of these issues in the society and the possibilities of food technologies to reduce them; with 2016/2017 study year a new study course "Emerging technologies" has been introduced in the program to explore new food processes (high pressure technology, ohmic heating, beam technologies, processing in a pulsating electric field, etc.) for the development trends of the food industry / science industry.

In order to evaluate whether the content of study courses / modules included in the study program corresponds to the real requirements of the field, the progress of graduates' work is monitored and the feedback provided by them is analysed (in the form of questionnaires, discussions).

Every year the lecturers involved in the study program review not only the content of the study courses, but also the content of independent works, assessment methods and bibliography; follows current events, attends professional development events.

When defending a master's thesis, the award of an academic master's degree is based on the achievements and innovative solutions of the field of food and beverage technology. Novelty is defined in each master's thesis, as well as contribution to the industry, especially if the development of the master's thesis is carried out in cooperation with manufacturers.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The modules included in the plan of the study program Food Science are designed for the logical structuring of the study program, succession of the content of the courses included in them and closer connection with the previously acquired study program to achieve the goal and fulfil the study results.

**1st Module “General study courses”.** Students acquire knowledge, skills and competencies in

the basic principles of scientific work development, research modelling and organization conditions, are able to perform mathematical processing of the obtained data, correct reading, display and interpretation of data, as well as in-depth knowledge of the most important legislation in Latvia and the EU. Students gain knowledge about integrated and specific quality systems in a food company. They are able to identify work environment risks in a food processing company using OHSAS standard requirements, additionally acquires FMEA quality management tools and quality cost analysis methodology, acquires knowledge about the application of TACCP and VACCP principles in the assessment of potential hazards in a food production company. Students gain knowledge about the microstructure and structural-mechanical properties of food products, their changes in technological processes, as well as during storage, by getting acquainted with the methods of determining the microstructure, viscosity and structural properties. They learn about nutrition and its role in maintaining health, understand the connection of nutrition science with the food industry.

*After mastering the module, students:*

- *are able to demonstrate knowledge in research methodology, analysing and evaluating the results of scientific research, substantiating their significance;*
- *are able to demonstrate in-depth knowledge and understanding of the latest trends in nutrition, which is the basis for creative thinking and research;*
- *are able to demonstrate an understanding of the general conditions of quality assurance in product development;*
- *are able to independently use theory, methods and skills in solving scientific problems - implementing innovations in the food industry, thus increasing the nutritional value of the developed products and improving the parameters characterizing their quality (structural-mechanical properties, etc.);*
- *theoretically know how to develop scientifically based food production technologies, and improve the operation of food quality systems for the production of products safe for consumers.*

*(see the arrangement of study courses in the appendix)*

**2nd Module "Food Chemistry".** Master students gain knowledge about the chemistry of natural substances and food biochemistry, flavours in food products, their formation and identification possibilities, which are important for further scientific research.

*After mastering the module, students:*

- *are able to demonstrate in-depth knowledge and understanding of the latest trends in food science, based on the aspects of food biochemistry and natural substance chemistry, which is the basis for creative thinking and research;*
- *are able to independently use theory, methods and skills in problem solving, to understand the changes in nutrients, including aroma-forming compounds in technological processes;*
- *are able to independently formulate and critically analyse, based on the acquired knowledge in food biochemistry, scientific and professional problem situations in food science, and substantiate the decisions made;*
- *are able to integrate knowledge of biochemistry and chemistry of natural substances, contributing to the creation of new knowledge and development of research methods.*

*(see the arrangement of study courses in the appendix)*

**3rd Module "Product Development".** Students gain knowledge in the field of new food and cosmetics, the application of biotechnology and food additives in the development of new products. During the acquisition of further study courses, basic knowledge in theoretical and practical aspects of food marketing is acquired, which is the basis for market environment research, as well as in-

depth knowledge in food industry business, organization and food production regulation. Applying the acquired knowledge in food design elements and methodology, students are able to generate and plan technological solutions and quality tests in the development of product prototypes using consumer tests.

*After mastering the module, students:*

- *are able to demonstrate in-depth knowledge and understanding of the latest trends in food, and demonstrate understanding of food design and product marketing;*
- *are able to prove theoretical and practical knowledge in biotechnology, food additives, selecting and applying them in solving specific issues, thus ensuring the successful promotion of products on the market;*
- *are able to independently use theory, methods and skills in solving problems, substantiating the parameters characterizing the quality of food products in product development;*
- *are able to choose and apply various scientific research methods in solving issues relevant to the industry, ensuring the promotion of food, including cosmetic products in the market;*
- *are able to take responsibility for the results of the work of a group of scientists, implement entrepreneurship and innovation in the food sector;*
- *are able to independently formulate and critically analyse scientific and professional problems when developing new food products and placing them on the market;*
- *are able to integrate knowledge from different fields, contributing to the creation of new knowledge and the development of research methods in the development of novel foods;*
- *are able to develop scientifically based food production technologies.*

*(see the arrangement of study courses in the appendix)*

**4th Module "Food Quality and Safety".** In this module students learn / understand the formation of microbial and chemical contamination of food products, the possibilities for their prevention. For further research, learn the theoretical foundations of various instrumental analysis methods and are able to apply these methods in food analysis. Students learn the basic principles of alternative methods and the possibilities of their use to ensure food safety. They gain knowledge about allergens in food, possibilities to reduce them in technological processes. Students gain knowledge about food packaging - packaging materials and technologies, recycling of used packaging and acquire knowledge about the impact of various factors on food spoilage, shelf-life, calculation and forecast. At the end of the semester, students defend the course project, providing theoretical findings for solving the research problem of the selected master's thesis, linking it with the current findings of food science.

*After mastering the module, students:*

- *demonstrate an understanding of food quality assurance conditions in product development and storage;*
- *are able to demonstrate knowledge by analysing and evaluating the results of scientific research, substantiating their relevance in the development of production technologies or products, preparing a literature review for the master's thesis;*
- *are able to demonstrate the acquired theoretical and practical knowledge by selecting and applying various scientific research methods: physically-chemical analysis of food products, etc .;*
- *are able to independently use theory, methods and skills in problem solving, and substantiate the safety of the developed food products;*
- *are able to choose and apply various scientific research methods, including alternative technologies, in solving issues relevant to the industry, including the reduction of allergens in food products for the development of products intended for various target groups;*

- *are able to analyse and creatively evaluate the results of research work, considering safety aspects;*
- *are able to take responsibility for the results of the work of a group of scientists, performing various experimental works to ensure new products and their quality during storage;*
- *are able to independently formulate and critically analyse complex scientific and professional problems in food science, creating a compilation of scientific literature for the development of the final work;*
- *are able to integrate knowledge of different fields (in perspective solutions in food packaging, food allergies and intolerances), contributing to the creation of new knowledge, creating a compilation of scientific literature for the development of the final work;*
- *are able to develop scientifically based food production technologies, improve the food quality system and operation for the production of consumer safe products.*

*(see the arrangement of study courses in the appendix)*

The **final semester of the studies** is dedicated to the elaboration of the master's thesis, within which the students perform a comprehensive compilation of scientific literature, substantiate the defined goal and tasks of the work; select the methods and equipment to be used for research; carry out experimental research in research laboratories, obtaining reliable results, which are summarized in the master's thesis.

*After mastering the module, students:*

- *are able to independently use theory, methods and skills in solving problems, and substantiate the parameters characterizing the quality of developed products;*
- *are able to take responsibility for the results of work in the implementation of innovations in the food sector;*
- *are able to integrate knowledge from different fields, contributing to the creation of new knowledge and the development of research methods;*
- *are able to develop scientifically based food production technologies, improve the food quality system and operation for the production of consumer safe products.*

*(see the arrangement of study courses in the appendix)*

The content of each study course included in the study program is designed so that its contents do not overlap with other study courses and successive acquisition of knowledge is ensured. When developing or updating the description of a study course, the lecturer takes into account the aim of the study program and the study results to be achieved, defining the results of the study course that will help to achieve the results of the study program in general.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

In accordance with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) adopted in Year 2015, the implementation of the academic master's study program Food Science encourages students to actively participate in the study process through

student-centred learning and teaching, thus stimulating student motivation, self-reflection and involvement in learning.

In the process of implementation of the study program Food Science, the opinion of students and the diversity of needs are taken into account and respected, suitable learning paths are created; various models of program implementation have been used (realization of study courses in blocks, etc.); various pedagogical methods are used; students' tendency to independence has been promoted; mutual respect in student-faculty relations has been promoted and appropriate procedures for resolving student complaints have been developed.

The study plan provides a mutually subordinated study course acquisition system in study modules, where the acquisition of one study course in a particular study module is based on the basic knowledge acquired in another course. This is possible by implementing each module courses in blocks. Such planning ensures sequential acquisition of knowledge. The study process for full-time master students, considering the master students' recommendations, lectures, laboratory work and practical work planning, is organized two days a week (on Fridays and Saturdays).

At the beginning of master's studies, the director of the study program acquaints students with the aim, tasks, results and research opportunities of the study program. This is followed by a discussion with students about the qualitative content of the study courses to be acquired, the goals, tasks to be performed for the course according to the calendar plan of the study semester and the results to be achieved after the study course. After mastering the study course, discussions are held with students and a survey is conducted on the quality of implementation of the course included in the study program. When evaluating the results of the student survey, the teaching staff considers the expressed proposals and evaluation, makes decisions on how to conceptually improve the study course programs. This is followed by work on the improvement of study course programs, and then the programs are evaluated and approved by the methodological commission of the faculty. The results of each study year are summarized in the study program self-evaluation report, which is reviewed and evaluated by the Study Council of Latvia University of Life Sciences and Technologies and approved by the Senate of Latvia University of Life Sciences and Technologies.

At the end of each study year, at the meeting of the Faculty Council, the director of the study program or the chairman of the Master Examination Commission (MEK) informs the teaching staff about the results of the study program.

Study methods are lectures, seminars, discussions, presentations, practical and laboratory works, Moodle e-learning environment. Studies are implemented on premises (contact hours: lectures, practical and laboratory works, seminars, research work) of Latvia University of Life Sciences and Technologies, outside the university premises (projects, scientific-research laboratories, conferences, courses, master's thesis development in a food company), independent work (reports, presentations, etc.), research work.

In the first study year, during the first semester, each master student chooses the direction of the scientific work, the topic of the master's thesis and the scientific supervisor. In the second and third study semesters, in parallel with the theoretical studies, the master student independently studies the scientific literature, analyses and summarizes the latest findings in accordance with the topic of the Master's thesis. At the end of the third study semester, the student defends the course work “Food Science”, which is practically a review of the literature for the master's thesis. The fourth study semester is planned for the development of the master's thesis.

The lecture materials of the study courses included in the Master's program include theoretical and practical findings - the theoretical aspects are reflected with examples from practical research experience. In turn, students' independent work consists of reports, presentations, scientific-

research works.

During lectures, multimedia projectors and internet resources are mostly used; lecture, practical / laboratory work and seminar materials are available in the Moodle environment.

The Faculty of Food Technology promotes the involvement of master students:

- In research projects and contracts financed by the Ministry of Education and Science, the Ministry of Agriculture and the ESF;
- elaboration of scientific publications and presentation of scientific results in national and international conferences.

The academic staff provides students with help and consultations: compulsory consultations - 2 times a week, contact hours during classes, communication by e-mail and telephone, as well as communication in the Moodle e-learning environment.

According to the decision of the Senate of the Latvia University of Life Sciences and Technologies No. 8-182 (10.06.2015) assessment of students' knowledge is evaluated on a 10-point scale (system). When passing study courses that end with an exam or a test with a mark, master students receive a grade in a 10-point system. In order to stimulate regular and independent studies, master students also have the opportunity to receive an accumulative assessment, based on systematic studies and fulfilment of the criteria set in the study program for receiving the accumulative examination. Master students take examinations in accordance with the Study Regulations of the Latvia University of Life Sciences and Technologies and the examinations are organized in the academic structural unit, the number of exams and tests per semester is regulated by the study plan. The examinations and tests with a mark, as well as an undifferentiated assessment “passed” or “failed” within in the Master's study program are assessed by the lecturer who conducts the respective study course. During the first lesson, lecturers also introduce the students to the knowledge and skill assessment system, which is also available in the information system - http://lais.llu.lv (*in Latvian*) of Latvia University of Life Sciences and Technologies. Students are informed about the requirements for successful completion of examinations. In the study process, the teaching staff uses various forms of knowledge assessment: multiple choice and open-ended answer tests, scientific-research works developed and defended individually and in groups, reports, presentations. Lecturers especially emphasize the students' ability to work with study and scientific - research literature, data processing and, based on theoretical knowledge and practical experience, analyse the obtained data, make and substantiate decisions.

The defence of master's theses takes place in an open session of the Master's examination commission. The staff of the Master's examination commission is approved by the order of the Rector of the Latvia University of Life Sciences and Technologies upon the recommendation of the Faculty Council.

The master's thesis is evaluated by awarding (if the mark is not lower than 4 points) or not awarding (if the mark is lower than 4 points) the master's degree in engineering in Food Science.

So far, no conflict situations have arisen during the implementation of the study program. Within the framework of the study program, it is envisaged that students solve the issues to be discussed with the director of the study program in the form of a dialogue - finding common ground. Students have the right to submit the formulated problem in writing to the dean of the faculty. In this case, the conflict situation would be resolved in the following order: at the level of the study course lecturer, at the level of the program director and at the level of the dean. Private problems can be solved with the program director, study problems - with the dean and with the vice-rector of Latvia University of Life Sciences and Technologies for studies.

In order to avoid conflict situations in the study process, a survey of master students and graduates is conducted every year about the possibilities and shortcomings of improving the study process.

Foreign students enrich the university study environment and are Latvia's ambassadors to the world. The presence of foreign students encourages the academic staff of Latvia University of Life Sciences and Technologies to be aware of the international dimension of studies and the importance of the university in European food science.

Students from third world countries (India, Uzbekistan, etc.) more often choose studies at Latvia University of Life Sciences and Technologies. International students have the opportunity to work in laboratories together with local students, thus developing the internationalization process. Specialists of the International Cooperation Centre provide all possible support to students studying in English: help in study planning, support in household issues, as well as help to integrate into the university and the Latvian environment.

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

**2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.**

The topics of the students' final theses are mainly related to the improvement of food functional properties (33%), developing or improving food production technologies, recipes, thus increasing the nutritional value of the product (see Figure 2.5.1). Several topics are related to the development of innovative food products (14%), as well as the processing of by-products for the introduction of residue-free technology in various food sectors (11%), as well as the production of new value-added products.

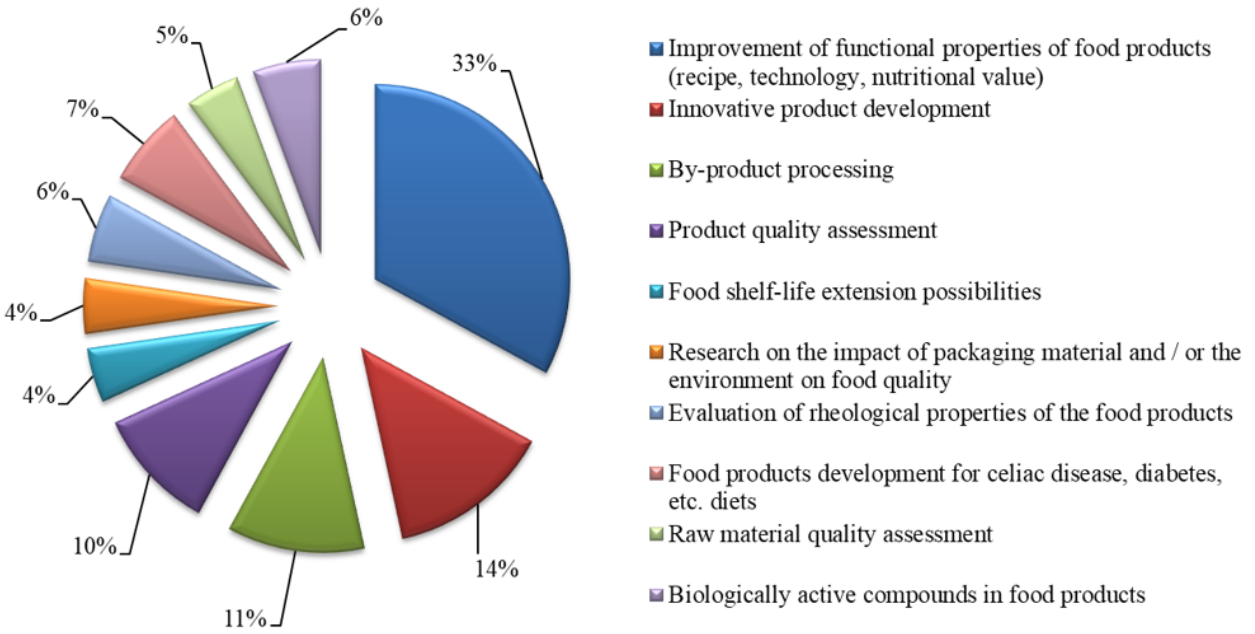


Fig. 2.5.1 Topics of master's thesis

One forth (Fig. 2.5.2) of the developed topics (21%) is related to solving problems relevant to manufacturers, e.g., scientifically based solutions / results have been developed in master's theses, which find application in solving various topical problems in the field, as well as in several master's theses products have been developed that are currently available on store shelves, which shows the relevance of master's theses to the industry. The development of several master's theses is related to the implementation of scientific projects (Fig. 2.5.2) (11%), the significance of scientific results is evidenced by the compilation of data in scientific publications (19%) and reports at scientific conferences (36%). The scientific level of the developed master's theses is evidenced by the received awards (5%) such as awards in competitions by the Development Finance Institution ALTUM, Latvian Academy of Agricultural and Forestry Sciences and Latvia University of Life sciences and Technologies .

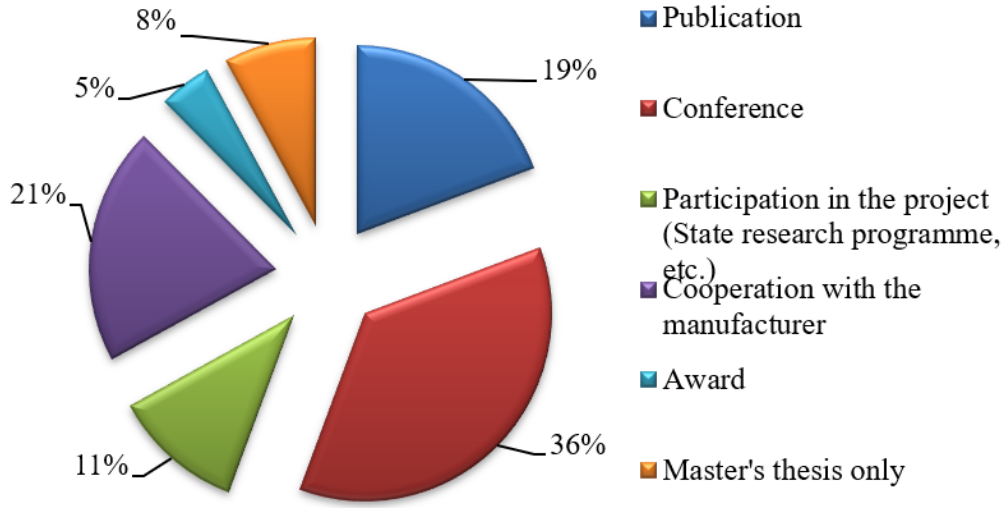


Fig. 2.5.2 Involvement of students in various activities

50% of the developed master's theses have been evaluated with "excellent" (Fig. 2.5.3), which indicates the quality of development. The evaluation of several master's theses is "outstanding" (7%).

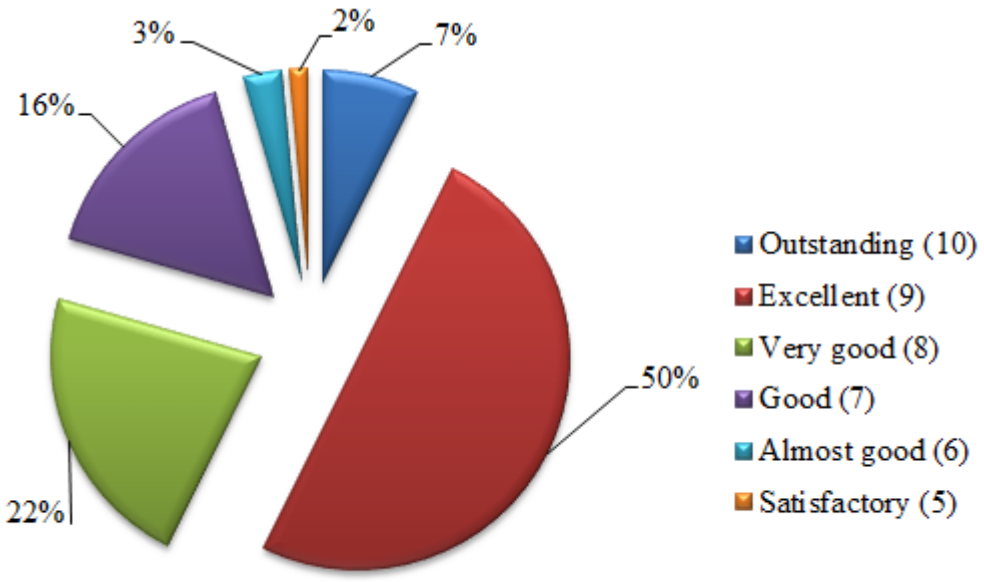


Fig. 2.5.3 Evaluation of master's theses

**2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.**

**STUDENTS**

The most important element for the improvement of the study content and the quality of the study program is the students' opinion about the study program and its implementation possibilities in order to ensure the competitiveness of the program and prepare specialists for the food industry. Students are very responsive in providing assessment. Every two years, a survey of students is conducted with the aim of finding out the students' opinion about what they have learned in previous semesters.

The survey, which took place in the spring of 2020 (78% of students participated), found that the majority of master students (57%) are **very satisfied with their master's studies,** while 43% of respondents are more satisfied than dissatisfied, which indicates a balance in the program content, quality of implementation and student satisfaction.

Assessing the situation with the spread of the pandemic caused by COVID19 and the implementation of distance learning, it was very important to find out the students' opinion about the **acquisition of study courses and the quality and availability of offered lectures and materials in the e-environment**; several views dominated in the responses:

- “I appreciate that all the necessary data was available in the e-environment; as well as distance learning did not affect the study process too much, it was possible to learn everything necessary ”;
- "All materials have always been appropriate";
- "Lecture materials are exhaustive, detailed", etc.,

confirming the quality of the implementation of study courses.

78% of the surveyed master students evaluate the **material-technical provision of the study process** as sufficient and appropriate, which reflects the quality of resources available at the faculty and compliance with the provision of competitive knowledge, skills and competencies.

The opinion of 100% of students about the **work of the teaching staff involved in the implementation of the study program** is highly valued, i.e. professional, knowledgeable and competent, which shows the students' satisfaction with the quality of the provided knowledge.

78% of the surveyed master students answering the question **"Which factors (of the above mentioned) hinders your studies?"** noted that nothing really interferes, which indicates the useful planning of the practical implementation of the study program.

Not only Faculty of Food Technology graduates study in the study program, but also graduates of other study programs, such as economics, natural sciences, etc., who noted (71%) that they would like **the study program to include** food technology study courses, while 15% would like to acquire data processing course, and another 14% - noted that nothing needs to be supplemented. In order not to duplicate the study courses included in the master's study program with those implemented in the undergraduate study programs Food Technology or Food Quality and Innovation, when discussing this issue at the Faculty Council meetings, it was decided that food technology courses will not be included, but the program implementers will provide students with answers during practical / laboratory work, seminars or teacher receptions.

Students are very positive about the **ERASMUS mobility opportunities** offered, but the pandemic did not allow them to be used to their full potential.

Answering the questions **"Which of the acquired study courses, in your opinion, should be excluded from the study program?"** and **"Which study courses do you think should be increased and which should be reduced?"** an unambiguous answer was not obtained, in the division of thoughts, which is more likely related to the level of complexity of the courses to be acquired and the students' own abilities to acquire them. Several proposals were made, which were taken into account in the correction of the content of the study program for the study year plan 2020/2021:

- for the study course “Natural substances in food systems I and II” (5CP), the students recommended to review the content side, which was taken into account and starting from 2020/2021 2 study courses “Chemistry of Natural Compounds” (3 CP) and “Food Biochemistry” (3 CP) have been created, combining “Regulation of Biochemical Processes” (2 CP) and “Natural Substances in Food Systems I”
- the recommendation of the students was to update the content part of the study course “Food product development”, which was taken into account and starting from 2020/2021 a new study course “Food Design” (4 CP) was introduced, combining “Food product development” (2 CP) and “Sensory and Consumer Science” (3 CP).

43% of the surveyed master students assesed **the balance of theoretical and practical training** noting that the proportion of practical training is too small, while 58% of the respondents consider the existing balance to be appropriate.

71% of the surveyed master students **prefer to organize the study process** on Fridays and Saturdays, i.e. according to the implementation.

Half of the surveyed master students note that they would **prefer to organize the study process in** study modules, which is also taken into account with study year 2020/2021 (general study courses, food chemistry, product development, food quality and safety).

**GRADUATES**

The opinion of the graduates is also very important for the evaluation of the implementation of the study program, because it is the graduates who continue their work in the field, providing scientific input and knowledge.

The survey of graduates found that 67% of respondents work in food production companies, 11% have related their careers to education and science, and 22% work in other fields: food distribution, chemicals and cosmetics.

It was found that more than 41% of respondents indicated career development as **the main motivation for studying in the master's program**, 48% noted that they want to acquire in-depth knowledge in the food industry, which indicates graduates' motivation to acquire the latest knowledge and increase their competitiveness in the labor market. Several of the surveyed graduates **continue their studies in the doctoral study program** "Food Science". 11% of the respondents wanted to continue their studies at a higher level, as well as acquire the necessary knowledge to successfully start a business in food production.

Master's studies promote (39%) / partially facilitate (44%) the **further professional development** of graduates, which testifies to the quality of knowledge, skills and competencies acquired during the implementation of the study program, preparing specialists for the food industry. 17% of the surveyed graduates noted that master's studies practically did not affect their professional growth.

Answering the question **"What is your benefit from completing a master's degree?"** (multiple answers could be chosen) graduates noted that:

- acquired the competence to independently formulate and critically analyze complex scientific and professional problems, substantiate decisions (19%);
- acquired competence to integrate knowledge from different fields (26%);
- acquired competence to develop scientifically based food production technologies, improve existing ones, manage food quality systems and develop monitoring to ensure them, as well as the ability to perform scientific work independently (12%);
- expanded the general level of education (31%).

The results of the survey confirm that upon graduation, the goal of the program has been achieved, namely, *to educate creative, decisive top-level specialists for the development and competitiveness of food science and production in Latvia and the European Union, providing them with comprehensive knowledge of food production and research skills for work.*

As the **main proposals for the improvement of the master's study program**, the graduates named:

- more study courses to solve real problems faced by the food industry;
- to promote the development of master's theses in cooperation with food companies;
- to increase the amount of practical classes, etc.;
- to include specialists in the field in the implementation of lectures / seminars in the study program.

*Currently, several of the recommendations are being integrated into the study process, namely, teaching staff have been provided with internship opportunities in various food companies within project "Internship Service For LLU Academic Staff In The Field Of Study Production And Transplantation, Project No. 8.2.2.0/18/A/014", helping the symbiosis of science and practice. There is a growing interest of food companies in cooperation with master students (for example, in the development of a master's thesis) to find a solution to the solution of production issues in a research context. At the time of preparation of the accreditation report, the content of the study courses included in the program was also reviewed, specifying the balance of theoretical and*

*practical classes.*

**EMPLOYERS**

The opinion of potential employers about the level of graduates' readiness for work in the food sector is important for the evaluation of the study program implementation.

The survey sought the views of employers from virtually all sub-sectors of the food industry, including agricultural producers, namely research, confectionery, fish, milk processing, meat processing, bakery and confectionery, alcoholic and non-alcoholic beverages, fruit and vegetable processing, agriculture and poultry farming, which gives employers a comprehensive vision of the training of specialists.

65% of the surveyed employers noted that **when hiring a new specialist, they prefer** a specialist with higher education, which indicates the employers' interest in attracting high-level specialists. 6% of the respondents prefer a specialist with a master's degree. 29% of employers emphasize that everything depends on the person and the position in the company.

In turn, 82% of employers claim that **they promote the education of their employees and support them for master's studies**, which indicates the necessity of the academic master's study program "Food Science" for the development and competitiveness of the industry.

71% of the surveyed employers confirm that **the level of preparation of graduates of the master's study program “Food Science” for the labor market** is sufficient, which indicates the compliance of specialists trained within the program with market requirements and full value of study program content, promoting creative, decisive .

63% of the surveyed employers, answering the question **"Please indicate to what extent the knowledge of the graduates of the master's study program "Food Science" corresponds to the mentioned indicators"**, have noted that the graduates:

- are able to show in-depth knowledge and understanding of the latest discoveries in food science (has been achieved);
- have acquired the theoretical aspects of the research methodology in depth (rather achieved);
- are able to analyze and evaluate the results of scientific work, substantiating their significance in the improvement of production technologies (rather achieved);
- are able to choose and apply various scientific research methods in solving issues relevant to the field (rather achieved);
- demonstrate an understanding of food design and quality assurance conditions in the development of new products (rather achieved).

56% of the surveyed employers, answering the question **"Please indicate to what extent the skills of the graduates of the master's study program "Food Science" correspond to the mentioned indicators",** note that the graduates:

- are able to independently use theory, methods and skills in solving problems, to substantiate the parameters characterizing the quality of food products (rather achieved);
- are able to use and methodologically substantiate the acquired theoretical knowledge in the development of the master's thesis (rather achieved);
- are able to explain and discuss scientific aspects in the field of food science in an argumentative way (rather achieved);
- are able to choose and apply various scientific research methods in solving issues relevant to the field (rather achieved);
- are able to analyze and creatively evaluate the results of the master's thesis, substantiate

their significance in the improvement of production technologies (rather achieved);
- are able to take responsibility for the results of the work of a group of scientists, to do business, innovations in the field of food science (rather achieved).

It is very positive that 24% of the surveyed employers believe that the skills of graduates are fully achieved.

In turn, assessing the extent to **which the competencies of the graduates of the master's study program "Food Science" correspond to the above-mentioned indicators,** employers indicate that the graduates:

- are able to independently formulate and critically analyze complex scientific and professional problems, justify decisions and, if necessary, perform additional analysis (77% rather achieved / 18% complete);
- are able to integrate knowledge from different fields, contribute to the creation of new knowledge and the development of research methods (53% rather achieved / 18% complete);
- are able to develop scientifically based food production technologies, improve existing ones, manage food quality systems and develop monitoring to ensure them (65% rather achieved / 18% fully achieved).

The results of the survey of employers confirm that in general the results of the study program have been fulfilled.

The opinion of the respondents is highly appreciated when answering the question: **Please express your assessment of the preparation of the graduates of the PTF master's study program "Food Science" for the requirements of the labor market,** where employers note that:

- highly qualified specialists with good knowledge and understanding of the food industry in general, are able to see the interconnections, analyze the processes, strong in the topic in which he developed the master's thesis;
- the preparation of the graduates of the Faculty of Food technology master's study program "Food Science" for the labor market is at a professionally high level;
- the most motivated, purposeful and capable graduates go to the master's program, therefore their readiness for the labor market is also at the highest level, etc.

When answering the question **What, in your opinion, should be improved in the master's study program "Food Science" in order to increase the competitiveness of graduates in the labor market**, employers note:

- to have more practice in order to learn methods and analyze the obtained results;
- to pay more attention to writing scientific articles, because master students are potential doctoral students;
- to promote the involvement of students in exchange programs;
- to promote cooperation with manufacturers, etc.

*Currently, several of the recommendations are integrated into the study process, especially the recommendations of graduates.*

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

Learning Mobility of Latvia University of Life Sciences and Technologies in connection with Erasmus+ Key Activity No. 1 Study mobility in higher education (KA1) is administered by the International Cooperation Center of the Latvia University of Life Sciences and Technologies. The Erasmus+ program provides an opportunity for students from Latvia University of Life Sciences and Technologies to gain experience in studies at one of the LLU partner universities and / or to practice in foreign companies. Erasmus+ mobility is possible for all students from Latvia University of Life Sciences and Technologies and higher education study levels and takes place in accordance with the Erasmus University Charter and the Erasmus+ Student Charter. Every student can implement mobility for 12 months (combined studies and practice) at each study level: undergraduate, advanced and doctoral.

In the Erasmus+ program, students from Latvia University of Life Sciences and Technologies can go on internships to foreign companies or institutions located in one of the Erasmus+ program countries. Despite the fact that the internship in the study program Food Science is not provided, students have the opportunity to apply for a voluntary internship in the free time period (spring).

Statistical data (see Table 2.7.1) indicate that student mobility is very even, i.e., 1-2 master students a year choose to acquire study courses at partner universities of the Latvia University of Life Sciences and Technologies. When choosing a specific higher education institution, the Master's student carefully considers the offer of study courses (according to the similarity of the content to the study courses of the Latvia University of Life Sciences and Technologies in the respective semester) together with the director of the study program, with the aim to equate them after returning to Latvia. After the return of students, the amount of comparable study courses is close to 100%.

Table 2.7.1

**Out-going mobility of students**

| Study year | Count of students | Country | Receiving institution | Mobility type | Amount (%) of equated study courses |
|---|---|---|---|---|---|
| 2013/2014 | - | - | - | - | - |
| 2014/2015 | 2 | Slovakia | Slovak University of Agriculture | Studies | 76 |
| | 1 | Greece | "Krivek" S.A. | Voluntary practice | ----- |
| 2015/2016 | 1 | Italy | University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca | Studies | 77 |
| | 2 | Slovakia | Slovak University of Agriculture in Nitra | | 82<br>77 |
| 2016/2017 | 2 | Czech Republic | University of Chemistry and Technology, Prague | Studies | 90<br>50 |
| | 1 | Germany | Fulda University of Applied Sciences | | 70 |
| 2017/2018 | 2 | Italy | Padova University | Studies | 100 |
| | 1 | Finland | Alands Centralandelslag | Voluntary practice | ----- |
| 2018/2019 | 3 | Poland | Warsaw University of Life Sciences | Studies | 100 |
| | 1 | Italy | University of Aldo Moro Bari | Voluntary practice | ------- |
| 2019/2020 | 3 | Poland | Warsaw University of Life Sciences | Studies | 100 |
| | | Italy | University of Padova | | 90 |
| | | Czech Republic | University of Chemistry and Technology | | 100 |
| | 3 | Estonia | Tallinn University of Technology | Voluntary practice | ---- |
| | | | Estonian University of Life Sciences | | |
| | | Czech Republic | University of Veterinary and Pharmaceutical Sciences in Brno | | |

Foreign students also choose to acquire various study courses within the Master's study program Food Science (Table 2.7.2). Student mobility was particularly active in 2019/2020.

Table 2.7.2

**Incoming mobility of students**

| No | Count of students | Country | Sending institution | Study semester |
|---|---|---|---|---|
| 1 | 1 | Czech Republic | Mendel University in Brno | Spring 2012/2013 |
| 2 | 1 | Kazakhstan | M.O. Auezov South Kazakhstan State University | Spring 2016/2017 |
| 3 | 1 | Czech Republic | Mendel University in Brno | Autumn 2017/2018 |
| 4 | 1 | Turkey | Adana Science and Technology University | Autumn 2018/2019 |
| 5 | 1 | Slovenia | Univerza v Ljubljani | |
| 6 | 1 | Czech Republic | University of Chemistry and Technology Prague | Autumn 2018/2019 |
| 7 | 1 | Czech Republic | University of Chemistry and Technology Prague | Autumn 2019/2020 |
| 8 | 5 | Czech Republic | Tomas Bata University in Zlín | |
| 9 | 1 | Germany | Hochschule Neubrandenburg - University of Applied Sciences | Spring 2019/2020 |
| 10 | 1 | Czech Republic | University of Chemistry and Technology Prague | Autumn 2020/2021 |

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

The support of administrative and technical staff is sufficient to ensure the achievement of study results. The implementation of the study program is ensured by the director of the study program, the methodological commission of the faculty and the dean. The methodological, informative and material-technical provision of the study program (incl. premises equipment, study environment, financing for students' self-government) is sufficient and is able to ensure an efficient study process.

Students have the opportunity to study independently and communicate with the academic staff electronically, using the e-environment and e-learning tools. Study materials are placed in the e-environment in the e-studies created by Latvia University of Life sciences and Technologies in the Moodle environment, which is available on the website: https://estudijas.llu.lv/?lang=en

International students and visiting professors have the opportunity to use service hotels and other services (computers, library, etc.).

The Fundamental Library of the Latvia University of Life Sciences and Technologies

(https://llufb.llu.lv/en) has information resources in different languages so that students can successfully implement their studies and obtain the necessary information for the development of scientific works. The Electronic Catalog of the Fundamental Library of the Latvia University of Agriculture contains information on more than 3,500 publications in the field of food science.

There are various options for searching for information:

- **Databases:**
  - AGRIS database;
  - "Electronic Catalogue of Fundamental Library of the LLU", "Publications of the Academic and Research Staff of the LLU", "Theses Presented at the LLU", "Master theses" and "Journal and Conference Articles of Latvia University of Life Sciences and Technologies",
  - Subscribed databases, E-journals, E-books: CAB Abstracts, CABI Animal Health and Production Compendium, CABI Crop protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO database, EBSCO eBook Academic Collection, Newspaper library, Letonika, ScienceDirect journals, Scopus, Escival, Web of Science, Wiley Online.
- **Library collections** (in agriculture - 38%, in natural sciences - 10%, in social sciences - 24%, in technology - 19%, in other branches of science - 9%);
- **Internet resources** (encyclopedia, dictionaries, etc.);
- **Information searchers and portals** (CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer LINK, etc.);
- **Work with scientific publications**:
  - Bibliographic references;
  - ORCID;
  - Publons;
  - Mendeley;
  - Books on writing publications.

From June 1, 2012, the Fundamental Library of Latvia University of Life Sciences and Technologies provides access to subscribed databases outside the network of Latvia University of Life Sciences and Technologies with the EZ proxy tool, using the LLU IS or E-study user account.

During the study year 2014/2015, the Study and Science Center of the Faculty of Food Technology of the Latvia University of Agriculture in Valdeka (22a Rīgas Street, Jelgava) was put into operation. Thanks to ERDF projects, the study and scientific base has been modernized:

1. No. 2010/0119 / 3DP / 3.1.2.1.1. / 09 / IPIA / VIAA / 009 “Modernization of LLU study infrastructure”;
2. No. 2011/0040 / 2DP / 2.1.1.3.1 / 11 / IPIA / VIAA / 002 “Research Center for the Utilization of Agricultural Resources and Food of National Importance” (2012-2015).

The sources of financing of the study program “Food Science” to be received in accordance with the procedures specified by the Latvia University of Life Sciences and Technologies are:

- LR state budget funds intended for the implementation of the study program by financing a certain number of study places;
- funds paid by persons for studies;
- funds from the development of scientific contract works (part of these funds is allocated for the renewal of materials and technical base, purchase of equipment and apparatus, purchase of chemicals and other auxiliary materials for specific analyzes, purchase of laboratory utensils, computer equipment, presentation equipment: multimedia, etc.);

- funding for the maintenance of scientific infrastructure;
- ERAF financing for modernisation of laboratory premises, materials for the improvement of the technical base.

An important condition for the implementation of the study process is the provision of premises, the capacity of laboratory premises and their provision. The study process takes place in the premises of Faculty fo Food Technology (22a Rīgas Street), but the implementation of separate study courses also takes place in other LLU buildings - the Faculty of Economics and Social Development (18 Svētes Street) and the Latvia University of Life Sciences and Technologies main building - the castle (1 Liela Street). All auditoriums have an internet connection, equipment available for lecturing - multimedia projector, computer, etc. The following laboratories with various scientific equipment are at the disposal of the faculty for the training of students and development of scientific works:

- sensory assessment laboratory (10 individual workstations equipped with FIZZ portable (BIOSYSTEMES, France) system, which is an interactive system for performing sensor tests and collecting and interpreting the obtained data)
- biotechnology laboratory (gastrointestinal simulation device)
- scientific laboratory of microbiology (colony counter, incubators, microscope with video camera and equipment, microscopes, microtome for light microscopy, microbiological analysis of water and beverages, refractometers)
- food quality laboratory (Kriostar for determining the freezing temperature of milk, distillation apparatus, viscograph for determining the viscosity of flour, farinograph, distillation apparatus for determining alcoholic strength, volatile acids)
- nutrition laboratory (flow injection equipment (for nitrite, nitrate determination in milk, meat products), hydrolysis equipment, filtration equipment for dietary fiber determination, fluorometer, extraction equipment set Soxtec 2045, distillation equipment set Kjeltec 2100, mineralization equipment with collector)
- packaging laboratory (equipment for packaging products in gas environment and vacuum, gas composition analyzer, equipment for pressure and tensile determination, gas mixer, portable color spectrometer, juice filler, autoclave (back pressure), vertical packaging equipment with dispenser)
- pilot plants (fruit and vegetable processing, grain processing, milk processing, meat and fish processing, bakery) (combi oven, meat mincer, cutter, digital shelf smokehouse, filling machine, pilot plant for concentrating liquid food products, freezer, cheese bath, homogenizer, multifunctional tank, threshing barrel, oven (shelf type) with fermentation, rotary bread oven with fermentation, single-screw and twin-screw extruders, dough mixers, brewing machine, juicer, oil press, termination equipment, climate chamber)
- process and equipment laboratory (high-pressure equipment, sublimation vacuum dryer, plate quick-freezing equipment, microwave vacuum dryer, equipment for microencapsulation of biologically active substances in laboratory conditions, plate and tube heat exchangers, film type evaporator equipment)
- scientific laboratory (Heed Space system Turbo Matrix16, ovens, hydrogen generator, gas chromatograph Clarus 500 with accessories, gas chromatograph with mass selective and offlactor detector, device for measuring the consistency of viscous liquids, solid-phase extraction device, centrifuge, automatic meter, ultrasonic bath, viscometer, structure analyzer, water activity meter, mass spectrometer, colour analyzer, UVNis spectrophotometer).

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture and the Latvia University of Life Sciences and Technologies. The tripartite agreement on funding for **2020** stipulates that the basic

cost of one study place is 1518.98 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program "Food Science" is 1.8 (Regulation of the Cabinet of Ministers “Procedures for Financing Higher Education Institutions and Colleges from the State Budget”), costs per student in the master's program “Food Science” amount to 4264.86 EUR.

Every year, the Senate of the Latvia University of Life Sciences and Technologies approves the distribution of revenues and expenditures of the general budget structure of the Latvia University of Life Sciences and Technologies, prepared in accordance with the Saeima annual law “On the State Budget” The control and audit of the general budget is performed by an independent sworn auditor, whose opinion and review report are reviewed and approved by the Senate.

Before approving the distribution of Latvia University of Life Sciences and Technologies general budget revenues and expenditures in the Senate, it is reviewed, discussed and approved by the Working Group on Resource Use and Development, which consists of Rector, Vice-Rectors, Chancellor, Latvia University of Life sciences and Technologies Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant head of the centre, key economists, key specialists in real estate and legal issues.

The distribution of income and expenses approved by the Senate of the Latvia University of Life Sciences and Technologies determines that 80% of the funding allocated from the state consists of remuneration costs and 20% other costs. 60% of the paid study funding consists of reimbursement costs and 40% other costs, of which 20% are directly at the disposal of the faculty that implements the respective study program. The amount of funding for the science base is calculated and allocated annually from active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

The tuition fee for the program is € 2200 per year for Latvian residents and € 4000 per year for non-Latvian residents.

The total distribution of the total budget of Latvia University of Life sciences and Technologies is formed by the estimates of structural units/faculties, where costs are estimated by type of expenditure.

The share of costs of the master's study program "Food Science" in Year 2020 consists of:

- Remuneration - 74%
- Scholarships - 7%
- Goods and services - 18% incl. utilities - 6%
- Share capital formation - 1%

For comparison, state funding by years in the master's study program "Food Science".

In **2019** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1518.98 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program “Food Science” is 4264.57 EUR.

In **2018** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1458.51 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program “Food Science” is 4100.66 EUR.

In **2017** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1393.33 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program "Food Science" is 3926.03 EUR.

In **2016** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program “Food Science” is 3204.23 EUR (in 2016, funding was only 84.45564% for the provision).

In **2015** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program “Food Science” is 3204.40 EUR (in 2015, funding was only 84.46058% for the provision).

In **2014** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master's program “Food Science” is 3178.11 EUR (in 2014, funding was only 83.7295803% for the provision).

In **2013** tripartite agreement on state funding for study programs stipulates that the basic cost of one study place is 1333.36 EUR, the study level coefficient for master's programs is 1.5 and the social security of the study place for master's programs is 164.34 EUR, the study cost coefficient for the master's program “Food Science” is 1.8, the cost per student in the master’s program “Food Science” is 3202.43 EUR

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

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

During the reporting period, the composition of the teaching staff did not change significantly, while the number of professors and associate professors involved in the academic master's study program Food Science had changes. In the study year 2012/2013, six professors and nine associate professors were involved in the implementation of the program, however, during the study year

2019/2020 , eight professors and five associate professors work in the implementation of the program (Table 4.1.1).

4.1.1. Table

**Number of academic staff involved in the academic master's study program "Food Science"**

| *Position* | *Study year* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *2012/ 2013* | *2013/ 2014* | *2014/ 2015* | *2015/ 2016* | *2016/ 2017* | *2017/ 2018* | *2018/ 2019* | *2019/ 2020* |
| *Professor* | *6* | *6* | *7* | *7* | *7* | *8* | *6* | *8* |
| *Associated professor* | *9* | *10* | *8* | *8* | *7* | *7* | *7* | *5* |
| *Assistant professor, visiting assistant professor* | *3* | *2* | *4* | *5* | *4* | *6* | *6* | *4* |
| *Lecturer, visiting lecturer* | -- | -- | *1* | *1* | -- | -- | -- | *1* |
| *Assistant* | -- | -- | -- | -- | -- | -- | -- | -- |
| *Leader researcher* | -- | -- | *1* | *1* | -- | -- | -- | -- |
| *Researcher* | -- | -- | -- | -- | -- | -- | -- | -- |

The number of teaching staff involved in the implementation of the program is mostly constant, i.e., 18-19 lecturers. Significant changes in the number of teaching staff (increase by ~ 18%) can be found in 2014/2015, 2015/2016 and 2017/2018 study years, which is mainly related to the modification of the study program (creation of new study courses, improvement of the content of study courses, as well as start of the implementation of the study program in English).

At the time of preparation of the self-assessment report, the elected academic staff involved in the study program was 85% and the unelected academic staff - 15%.

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

Ensuring in-service training of the teaching staff of the Faculty of Food Technology is being implemented by the academic staff participating in various special courses or seminars on qualification improvement and acquisition of individual professional skills in Latvia and abroad, including BOVA courses, methodological and organizational work, research projects, consulting functions, as well as actively participating in the annual teaching-methodological conferences organized by Latvia University of Life Sciences and Technologies. The knowledge and competencies acquired in the process of professional development and research work are creatively used in the

study process.

The teaching staff of the faculty actively participates in the courses “Innovations in the system of higher education and didactics of higher education institutions” organized by Latvia University of Life Sciences and Technologies, e-study courses “Moodle environment”, etc.

Faculty members actively participate in ERASMUS experience exchange programs (Table 4.2.1), giving lectures to foreign students and raising their qualifications, for further transfer of experience to increase the knowledge of students involved in the study program, as well as to promote innovation. Lecturers provide consultations, as well as participate in various events that are related to study issues (updating the content of study courses, etc.). As a result of mobility, lecturers have the opportunity to work with students from other countries, which is a great challenge and also a good experience that can be used in the future when working with foreign students in Latvia; the opportunity to lead classes and communicate with colleagues in a foreign language, which gives lecturers both confidence in their abilities and expands language knowledge and use skills, creates additional motivation to improve language skills; the opportunity to share the experience with specialists in their field in another country, to discuss the content, methods, etc. of teaching specific courses; opportunity to expand knowledge about the processes taking place in your industry and development trends in the host country (new laboratories, equipment, technological solutions, etc.); opportunity to establish contacts for further cooperation (projects, teaching aids, books, organization of conferences, etc.).

4.2.1. Table

**Out-going mobility of staff**

| Study year | Amount of staff | Country | Name of receiving institution | Mobility type |
|---|---|---|---|---|
| 2013/2014 | 1 | Turkey | Abant Izzet Baysal University | Lectures |
| | 1 | Germany | Fulda University of Applied Sciences | |
| 2014/2015 | 1 | Lithuania | Lithuanian University of Health Sciences | Lectures |
| | 2 | Italy | Universita degli Studi di Bari Aldo Moro | |
| | 2 | Turkey | Abant Izzet Baysal University | |
| | 1 | Germany | Fulda University of Applied Sciences | |
| | 2 | Poland | University of Agriculture in Krakow | |
| | 2 | Estonia | Tallinn University of Technology | Exchange of experience |
| 2015/2016 | 3 | Spain | Universitat Politecnica de Valencia | Lectures |
| | 2 | Turkey | Abant Izzet Baysal University | |
| | 2 | Slovakia | Slovak University of Agriculture in Nitra | |
| | 1 | Poland | University of Agriculture in Krakow | |
| 2016/2017 | 2 | France | National Polytechnic Institute of Toulouse | Lectures |
| | 1 | Greece | Agricultural University of Athens | |
| | 2 | Czech Republic | University of Chemistry and Technology | |
| | 2 | Italy | University of Padova | |
| | 1 | Slovakia | Slovak University of Agriculture in Nitra | |
| | 1 | Portugal | NOVA University Lisbon | |
| | 1 | Italy | Universita Degli Studi di Bari Aldo Moro | |
| | 1 | Bulgaria | Varna University of Management | Exchange of experience |
| | 2 | Poland | University of Agriculture in Krakow | |
| 2017/2018 | 2 | Turkey | Akdeniz University | Lectures |
| | 1 | Turkey | Abant Izzet Baysal University | |
| | 1 | Greece | Agricultural University of Athens | |
| | 2 | Italy | University of Padova | |
| | 2 | France | National Polytechnic Institute of Toulouse | |
| | 1 | Czech Republic | University of Chemistry and Technology | |
| | 1 | Germany | Fulda University of Applied Sciences | |
| | 1 | Austria | BOKU University of Natural Resources and Life Science | Exchange of experience |
| | 1 | Czech Republic | Czech University of Life Sciences | |
| | 1 | Turkey | Akdeniz University | |
| 2018/2019 | 1 | Poland | Warsaw University of Life Sciences | Lectures |
| | 1 | Cyprus | InterNapa College | |
| | 1 | Turkey | Akdeniz University | |
| | 2 | Italy | University of Padova | |
| | 1 | Slovakia | Slovak University of Agriculture in Nitra | |
| | 1 | Spain | Universitat Auonoma de Barcelona | Exchange of experience |
| | 1 | Italy | Italian Sensory Science Society (SISS) | |
| 2019/2020 | 1 | Estonia | Tallinn University of Technology | Exchange of experience |

The adequacy of the qualification of the academic staff in achieving the goals and tasks set by the higher education program is evidenced by the scientific and methodological development of the teaching staff, research directions and real use of in-service training opportunities, the main criteria of which are: didactic qualification and competence management, published study materials and international competence (internship abroad); scientific qualification, emphasizing the management of scientific projects or participation in their development, as well as international cooperation in the field of science; scientific publications both in Latvia and abroad, as well as participation in international conferences, seminars, congresses; organizational activities related to the performance of studies and scientific work; management of bachelor's, master's and doctoral theses.

There is regular planning and implementation of the academic staff development policy.

The teaching staff of the study program regularly improves their professional competence by

acquiring the professional development program for higher education teachers “Innovations in the didactics of the higher education institution” offered by the Latvia University of Life Sciences and Technologies and acquiring the latest findings in pedagogical work, information technology management, bibliographic news, etc .; implementing scientific projects and gaining new knowledge in the fields of food science.

**In the study year 2014/2015** , with the support of the Language Center of the Latvia University of Life Sciences and Technologies, the lecturers improved their English language skills. 10% of the teaching staff of the study program participated in the training seminar “Preparation of Scientific Articles”, 5% - in the international course “Improving communication between food technologist and consumer during the food innovation process” in Sweden.

In the study year 2015/2016 :

- 18% of lecturers mastered the professional development program of higher education teachers offered by the Latvia University of Life Sciences and Technologies "Innovations in the didactics of the higher education institution" and participated in the activity of the EEA / Norwegian financial instrument program "Research and Scholarships".
- 9% of the lecturer improved their knowledge of foreign languages.
- 14% of lecturers studied "Investors in Excellence", i.e. standard requirements and methods for courses of excellence, getting acquainted with the methodology and preconditions for obtaining a certificate of excellence.

During the **study year 2016/2017**, the teaching staff gained experience working in professional organizations and giving lectures to foreign and ERASMUS + students at Latvia University of Life Sciences and Technologies, as well as participating in ERASMUS + mobility. 44% of lecturers participated:

- in the seminar “Possibilities for Determining and Testing the Expiration Date of Food”;
- seminar “Networking and educational cooperation over Baltic borders-Water protection, food and forestry”;
- in the seminar "Innovative packaging for milk and dairy products";
- ZRKC (Zemgale Region Human Resource and Competences Development Centre) seminar “Creating ideas” Charging - discharging”;
- ZRKC (Zemgale Region Human Resource and Competences Development Centre) seminar “Idea fitness II Innovator DNA and innovation CAT training”;
- Latvia University of Life Sciences and Technologies seminar "Time Management";
- Seminar of the Latvian Chamber of Commerce and Industry “Allergen Management in a Food Chain”;
- Latvian Medical Association conference "Healthy and quality food in Latvia";
- Riga Stradins University Agency "5th Labor Protection Film Afternoon";
- Latvia University of Life Sciences and Technologies seminar "Happiness in emotional intelligence";
  seminar “Latest Advances in Food analysis using LC-MS / MS”;
- in the seminar "Heracles electronic covers";
- courses "AutoCAD 3D" organized by the training centre "AUTODESK";
- Latvia University of Life Sciences and Technologies seminar "How to be flexible in communication";
- in the seminar "Questions to ask yourself before the public presentation";
- in the seminar "Public speech and presentation";
- in the seminar "Accurate detection and identification of contaminants and by-products in food, the latest advances in forensics, high-resolution mass spectrometer X500R, use of high-

sensitivity LC-MS / MS and LC-HRMS for water analysis, use of QTRAP technology for quantitative analysis";
- Academic Information Center expert training courses “Higher Education Quality Assessment” and “Study Field Evaluation Simulation” (ESF project “Support to Fulfillment of Requirements for EQAR Agency”;
- 11% of the teaching staff of the study program acquired the professional development program of higher education teachers “Innovations in the didactics of the higher education institution” offered by the Latvia University of Agriculture; improved knowledge of foreign languages; participated in LLU Teaching Methodological Conference "Internationalization at Latvia University of Agriculture".

In the study year **2017/2018**, the teaching staff gained experience working in professional organizations and giving lectures to foreign and ERASMUS + students at Latvia University of Life Sciences and Technologies, as well as participating in ERASMUS + mobility.

52% of the involved teaching staff of the study program “Food Science” gained experience by attending professional development programs, seminars, courses:

- Latvia University of Life Sciences and Technologies, Faculty of Food Technology, Beer Brotherhood, Baltic Beer Star seminar organization and training “The role of sensory methods in the ancient evaluation of beer”;
  State Education Development Agency and Latvian Young Scientists
- Association Future Scientists Forum “What does it mean to be a scientist?”;
- Scientific-practical seminar "Legumes - a valuable source of protein: cultivation, nutritional value, use in food and feed";
- Latvian Agriculture organized courses "How to be flexible in communication";
- Seminar “Digestive Disease Nutritionist in Practice”;
- Course “Discovering a sustainable mindset for future thinking professionals in household and guest-oriented businesses” (University College for Agrarian and Environmental Education, Austria);
- Seminar: International Work Based Learning in Agribusiness Sector Teramo;
- Practical seminar “Hands-on Training on Baking Technology”;
- Courses: Sensory evaluation program "Fizz Network".
- Courses: Work with Latvian higher education information system;
- Courses: Training on search options in EBSCO databases and e-books.
- Seminar of the Latvia University of Agriculture “Work-based learning and internationalization”;
- Seminar: “Change Thinking Strategy”;
- Courses: “Public speech and presentation”;
- Seminar: “Innovation and development opportunities in food processing”;
- Seminar: "Agriculture: research, practice and experience";
- Seminar: “Introduction to Psychosophy”;
- Seminar: “Conducting healthy eating classes for children and youth”;
- Seminar: "News in the field of meat processing and fish processing";
- Seminar: "Italian Bakery Bakery Products".
- Scientific-practical seminar "Innovations in food production" within the framework of the international exhibition "Riga Food 2017", Riga;
- Scientific-practical seminar "Legumes - a valuable source of protein: cultivation, nutritional value, use in food and feed", Jelgava;
- Courses: The School of Food Engineering at the University of Campinas, Sao Paulo School of Advanced Sciences in Reverse Engineering of Processed Foods.

During the **study year 2018/2019**, 32% of lecturers attended the professional development program for higher education teachers “Innovations in Didactics of the University” offered by the Latvia University of Agriculture. In order to follow the latest trends in the field of bioeconomy and its role in the national economy, the lecturers attended general education seminars “Innovations in the bioeconomy sector in higher education” (09.05.2019, Jelgava) and “Bioeconomy sector contribution to the Latvian economy” (01.02.2019, Jelgava). The teaching staff annually participates in the Latvia University of Life Sciences and Technologies Academic Conference “I am in the Latvia University of Life Sciences and Technologies study process”, both with oral presentations and as listeners. Also, the knowledge about the use of E-studies was supplemented by the majority of PTF lecturers. 58% of lecturers participated in several seminars, professional development programs to improve their qualification:

- Zemgale Region Competence Development Center ESF project “Implementation of Complex Health Promotion and Disease Prevention Measures in Jelgava City” No. 9.2.4./16/I/085 9-hour course education program “Eat smart”;
- State Education Content Center ESF project “Effective management of vocational education institutions and improvement of staff competence” No. 8.5.3.0/16/I/001 professional development program courses “Methodology and practice of modular education program development” in the amount of 16 h;
- Jelgava Polyclinic Academy seminar: “Diabetes and cardiology - crossroads and intersections. Diabetes and cardiovascular protection";
- seminar “Informal conversations (small talk)”;
- seminar “Design Thinking”; S
- seminar “Versatile opportunities for modern education - international experience” (6 hours);
- Participation in the seminar “Rheology Day” organized by SIA Armgate in cooperation with Anton Paar (Austria) (1 day);
- Participation in the seminar organized by the World Food Science and Technology Association (IUFoST) on the positive health functionality and impact of food engineering paradigm (1 day).
- ESF project "Effective management of vocational education institutions and improvement of professional competence", agreement No.8.5.3.0 / 16 / I / 001 seminar "Topicalities and innovations of food production";
- Seminar “Innovations in the bioeconomy sector of the higher education”;
- Participation in the seminar organized by the University of Latvia “Student-centered learning methods in the 21st century. skills development ”;
- Autonomous University of Barcelona course “XVII workshop on Rapid Methods and Automation in Food Microbiology (MRAMA)”, 32h;
- Latvia University of Life Sciences and Technologies higher education teachers' professional development program “Innovations in higher education didactics” (4 CP);
- FIZZ Network sensory software: Master the essential concepts of FIZZ sessions;
- International Baltic professional beer, malt beverage and kvass competition BALTIC BEER STAR 2018;
- Courses organized by the Italian Sensory Sciences Society (ISSS) Preferences expectations understanding contexts emotions consumers individual differences product characterization;
- Sensory evaluation of honey “Latvian Beekeepers Summer Meeting 2019”;
- Seminar "Prerequisites for the implementation of the General Data Protection Regulation";
- Latvia University of Life Sciences and Technologies study process (6 h), Latvia University of Life Sciences and Technologies academic conference;
- Participation in the courses “Demand, assortment and production trends for household products and niche products in the European Union” (Demand, assortment and production

directions of household and niche products in the European Union);

- Participation in courses “- News in ice cream and milk processing. NEO AS together with AarhusKarlshamn AB, Nimbus Foods and Chr.Hansen, Riga;
- English language courses (level B2), Training and Consulting Center "Līderis";
- Latvia University of Life Sciences and Technologies methodological conference “Towards accreditation of study fields / programs” Latvia University of Life Sciences and Technologies, Jelgava.

**In 2019/2020** lecturers of the study program Food Science improved their qualification in the professional as well as pedagogical field by acquiring both the course “Innovations in Didactics of Higher Education” offered by the Latvia University of Agriculture and educational thematic events organized by the Lifelong Learning Center, etc. offers of institutions:

- Lecturers of the study program (61%) within the project No.8.2.2.0 / 18 / A / 014 “Improvement of LLU academic staff” in Zemgale Region Competence Development Center improved their English language skills (120 h courses and 32 h individual lessons).
- The teaching staff (22%) attended the course “Namejs Manager” organized by RIX Technologies.
- In order to work more successfully with students using new digital methods, teachers (72%) attended ZRKAC courses MS Cloud Services for Data Storage and Sharing, Dynamic and Active Presentation .
- The teaching staff annually participates in the LLU Academic Conference “LLU on the way to assessment and accreditation of study fields” in order to better understand the accreditation process of study programs.
- Within the framework of the project No.8.2.2.0 / 18 / A / 014 “Improvement of the LLU academic staff”, the teaching staff (17%) had the opportunity to improve their professional knowledge by doing internships in various companies: AS Tukuma piens, SIA Lāči.

In order to increase the competencies of Latvia University of Life Sciences and Technologies employees, courses “What to do with the place?”, “I in the Latvia University of Life Sciences and Technologies study process” and “Why are so many good ideas for a brighter life again postponed to Monday?” were organized by the lecturers involved in the program.

In parallel with the above-mentioned professional development courses, the teaching staff (11%) uses the opportunity and improves their knowledge by attending various other offered seminars and courses:

- Education Leaders Forum “Education VAR” (6 h program) SIA LPX Events;
- Latvia University of Life Sciences and Technologies, "Innovations in higher education didactics" (160h);
- ZRKC (Zemgale Region Human Resource and Competences Development Centre) courses "Design Thinking for Entrepreneurs" (64h).

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

During the reporting period, the staff involved in the academic master's study program very actively participated in the implementation of international projects (about 50%), State research programs (about 50%), ministries, European support funds and by Latvia University of Life Sciences and Technologies funded projects, as well as several programs (more than 30%) "Growth and employment". Specific support objective "Increase private sector investment in R&D" 1.2.1.2. in the projects of the measure "Support for the improvement of the technology transfer system", strengthening cooperation with manufacturers (for a summary of the projects, see the Annex).

Master's students were also involved in the implementation of several projects, for example, the master's theses defended within the framework of the State Research Program “Agricultural Resources for Sustainable Production of Quality and Healthy Food in Latvia” (AgroBioRes) (2014–2017): Development of new gluten-free pasta; Evaluation of the quality of variously dried pumpkin, blackcurrant and apple pomace; Use of enzymatically hydrolysed wheat bran in bread production; Use of common wheat, rye and tricycle flour in pasta production; Potato fryer quality improvement studies; Vegan cake development; Use of dairy barley grains in the manufacture of sour milk products; Effect of herbal extracts on acrylamide formation in french fries, etc.

Scientific cooperation between companies and scientists is an important driver for industry development. The knowledge or technologies and products generated by such cooperation are disseminated to companies in the sector, fostering development and innovation. These results are also published internationally, creating the recognition of the Latvian food industry outside Latvia. The Faculty of Food Technology of the Latvia University of Life Sciences and Tehnologies is one of the most important scientific partners in the field, whose researchers actively cooperate with companies in the field.

The new knowledge, skills and competencies acquired in the implementation of projects have given lecturers opportunities to improve the content of the study courses included in the study program.

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

**Assessment Report).**

The cooperation of the teaching staff involved in the academic master's study program Food Science takes place in: the development and updating of the content of the study courses; improvement of methodological work; the implementation and integration of scientific achievements in the study process; sharing practical experience.

In order to ensure the succession of study courses included in the study program and the quality of content to achieve the goal of the study program, the content of study courses is updated at least once a year in department meetings, council meetings, as well as in informal communication. Regular lecturers share their experiences and discoveries, looking for solutions to improve the content of the study program / course. Teaching staff is involved in the implementation of the study program by regularly attending various courses, seminars, etc. in order to further improve their pedagogical and professional qualification; they try to integrate the acquired findings into the implementation of study courses, thus raising the level of the study program in general and increasing its competitiveness.

The ratio of the number of students and teaching staff within the study program (at the time of submitting the self-assessment report) is 10.6.

# Annexes

| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
|---|---|---|
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | SV - Annex - no5.pdf | SV - Pielikums - nr5.pdf |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | PZ_M_standard.docx | PZ_M_atbilstiba_Valsts_standratam.docx |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | FS_arrangement.xlsx | PZ_kartejums.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | SV - Annex_N0_9.docx | SV - Pielikums nr9.docx |
| Descriptions of the study courses/ modules | Study courses.pdf | Studiju kursu saraksts.pdf |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | Diploma_ENG.rar | Diploms_LV.rar |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Sample (or samples) of the study agreement | 18_Study_Agreement_LV_EN_2021.pdf | 18_Studiju_ligums_2021 (1).pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | mag_stud_progr_Pārtikas zinātne_AIP atzinums_EN.docx | mag_stud_progr_Pārtikas zinātne_AIP atzinums (1).edoc |

# Wood Materials and Technology (45543)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Wood Materials and Technology* |
| Education classification code | *45543* |
| Type of the study programme | *Academic master study programme* |
| Name of the study programme director | *Andis* |
| Surname of the study programme director | *Ābele* |
| E-mail of the study programme director | *Andis.Abele@llu.lv* |
| Title of the study programme director | *Inženierzinātņu doktors (Dr.sc.ing.)* |
| Phone of the study programme director | *63029184* |
| Goal of the study programme | *To prepare highly qualified specialists who are endowed with creative and independent decision-making ability and who promote the further development of the industry through scientific, pedagogical, and professional activities.* |
| Tasks of the study programme | *To prepare academically educated masters of engineering for scientific work in higher education institutions, secondary special education institutions, as well as masters for further doctoral studies, highly qualified specialists for work in state and municipal institutions, economical self-government structures and in public or private companies and advisory services related to the forest sector.* |
| Results of the study programme | *Knowledge: to explain and interpret knowledge and processes about wood materials and technologies and industry policies and strategies, to independently compare and use research and data analysis methods, accumulation and use of information in both theoretical and practical aspects.*<br>*Skills: choosing the most appropriate methods, practically research, experiment, summarise, compare, draw reasoned conclusions, and use the obtained information related to the problems of wood materials and wood processing technologies and new product development, analyse, and publish research results in scientific and popular scientific publications.*<br>*Competences: to adapt and create new opinions based on research, to perform scientific work and present results, to evaluate and independently make decisions, proposals, to substantiate opinion and integrate acquired knowledge and skills into new situations in professional and scientific activities, solving wood materials and technology problems, to evaluate and perform quality monitoring and development, introduction of innovations in the field of wood materials and technologies, as well as to manage personnel.* |
| Final examination upon the completion of the study programme | *Development and defending of a master's thesis for obtaining a scientific degree of a master's in engineering materials and technology (in the sub-field Wood materials and technology of the science field Materials science).* |

## Study programme forms

**Full time studies - 2 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *2* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *80* |
| Admission requirements (in English) | *Bachelor's degree or second level professional higher education in wood processing, forestry, construction, architecture and design or related branches* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Master Degree of Engineering in Wood Processing Technologies* |
| Qualification to be obtained (in english) | - |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

## 1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction

**Study level**

The academic master´s study programme. There have been no changes during the reporting period. The implementation of the study programme began in 1990.

**Objectives and tasks of implementation**

**Objective:** to prepare highly qualified specialists who are endowed with creative and independent decision-making ability and who promote the further development of the industry through scientific, pedagogical, and professional activities.

**Tasks:** to prepare academically educated masters of engineering for scientific work in higher education institutions, secondary special education institutions, as well as masters for further doctoral studies, highly qualified specialists for work in state and municipal institutions, economical self-government structures and in public or private companies and advisory services related to the forest sector.

There have been no changes during the reporting period.

**Directions of specialisation**

From academic year 2015/2016, the study programme has the following directions of specialisation:

- use of wood in structures;
- industrial design in woodworking;
- logistics and marketing in the wood industry.

Until academic year 2014/2015, the study programme had the following directions of specialisation:

- wood science, wood constructions;
- wood processing machinery and technologies;
- industrial design of wood products;
- complex use of wood.

The changes have been made based on the results of student surveys. In order to evaluate the programme from the point of view of master's students, a questionnaire was created in 2013 and 2014 and 1st and 2nd year master's students were interviewed. The questionnaire includes questions about the study programme as a whole and the study courses included in it. The results of the surveys indicated that the majority of students are dissatisfied with the offered study courses in the general course block, basing their opinion on the fact that, in the study programme, there are too many courses that are not directly related to wood processing and industry, that do not directly apply to the corresponding study programme; several study courses are not related to wood materials and technologies, but to forestry, which is directly related to other master's study programmes offered by the Forest Faculty. This situation has developed because students of the

master's study programme Wood Materials and Technology have studied several study courses simultaneously with students of other master's study programmes of the Forest Faculty and considering that the number of students in other study programmes has been significantly higher, the study course content has been made binding on the majority. The recommendation of students is to update the content of the study programme by including study courses that are directly applicable to the corresponding study programme. Consequently, purposeful changes have been made in the study programme, which is acquired by the applicants starting from the academic year 2015/2016.

In order to update the content of the study programme, several new study courses have been developed:

- In 2014, combining special study courses, three specialisation directions with central study courses were created: MatZ5024 Uses of Wood in Structures I (5.0 CP); MatZ5025 Uses of Wood in Structures II (5.0 CP); MatZ5028 Industrial Design in Wood I (5.0 CP); MatZ5029 Industrial Design in Wood II (5.0 CP); MatZ5026 Logistics and Marketing in the Timber Industry I (5.0 CP); MatZ5027 Logistics and Marketing in the Timber Industry II (5.0 CP). These are included in the study programme plan, starting from academic year 2015/2016;
- In 2015, based on the updating of the study plan started in the previous study year, new study courses were created: MatZ5033 Newest Trends in Industry (2.0 CP), MatZ5034 Uses of Wood in Structures III (7.0 CP) and MatZ5035 Uses of Wood in Structures IV (6.0 CP) to continue the implementation of specialisation directions;
- In 2016, in order to ensure the continuation of the specialisation, new study courses have been developed, which are provided for in the 2nd year of the study programme: MatZ6003 Industrial Design in Wood III (7.0 CP), MatZ6004 Industrial Design in Wood IV (6.0 CP), MatZ6001 Logistics and Marketing in the Timber Industry III 7.0 CP), MatZ6002 Logistics and Marketing in the Timber Industry (6.0 CP).

Based on the results of the survey conducted after the study programme update plan, it was found that students' satisfaction with study courses and content has significantly increased and that a successful solution is to develop a master's thesis within research projects, which allows for reducing costs necessary for practical research, as well as to present research results at scientific and practical conferences. The students also have an easier-to-understand study plan and possibly fewer tests and exams to take, which also reduces the potential that study courses are not successfully passed.

The content and planning of the study programme envisages purposeful specialisation, because more than a quarter of the study courses are subordinated to the chosen specialisation, but also including the time spend for research internships and master's thesis development. The student devotes more than three quarters of the volume of the study programme to the specialisation. Considering that students, who have graduated not only the profesional bachelor's study programme, Wood Processing, but also other related study programmes, can enter the study programme, general study courses are also provided, within which students can equalise the level of knowledge on topics such as wood science and the value of the forest, as well as to renew knowledge corresponding to the academic level in such study courses as philosophy of science, preparation of research papers and use of mathematical methods. The inclusion of such study courses in the study programme plan is also positively assessed by those students, who start their studies a longer period of time after completing previous higher education.

**Type and length of studies**

Full-time studies, 2 years (4 semesters). There have been no changes during the reporting period.

When evaluating the study programme, the experts of the industry have recommended reviewing the policy regarding the total duration of studies, reducing it to 1.5 years, without reducing the amount of total credit points to be obtained. However, based on the Law on Higher Education Institutions, and its amendments, the duration of the academic master's study programme is one or two years. Consequently, it is not possible to reduce the duration of studies to 1.5 years, maintaining the status of the academic master's study programme. The solution, which envisages the duration of studies for one year, is not useful, because, taking into account the students' opinion, the duration of studies would be insufficient for the development of final thesis, because often the final theses are related to relatively time-consuming research. Replacement of the academic master's study programme with a professional master's study programme, the duration of which is allowed to be 1.5 years, is not considered. Consequently, no decision is currently being considered to reduce the duration of studies.

**Degree to be obtained**

Master Degree of Engineering in Wood Processing Technologies.

**Intended learning outcomes for the programme**

From academic year 2020/2021 the study programme has the following study results:

- knowledge: to explain and interpret knowledge and processes about wood materials and technologies and industry policy and strategies, to independently compare and use research and data analysis methods, accumulation and use of information in both theoretical and practical aspects.
- skills: choosing the most appropriate methods, practically research, experiment, summarise, compare, draw reasoned conclusions, and use the obtained information related to the problems of wood materials and wood processing technologies and new product development, analyse, and publish research results in scientific and popular scientific publications.
- competences: to adapt and create new opinions based on research, to perform scientific work and present results, to evaluate and independently make decisions, proposals, to substantiate opinion and integrate acquired knowledge and skills into new situations in professional and scientific activities, solving wood materials and technology problems, to evaluate and perform quality monitoring and development, introduction of innovations in the field of wood materials and technologies, as well as to manage personnel.

Until academic year 2019/2020 the study programme had the following study results:

- knowledge: by acquiring the academic master's higher education study programme, Wood Materials and Technology, the master students gain in-depth knowledge of the latest findings in the field of wood materials and technologies, research and data analysis methods, information collection and use in a theoretical and practical way.
- skills: master’s students can practically research, compile, analyse and use information related to the problems of wood materials and wood processing technologies, to publish the results obtained in research in scientific and popular scientific publications.
- competences: as a result, the master’s student is competent in the theoretical and practical aspects of wood materials and technologies, is able to independently develop, in accordance with the existing requirements, and submit a master's thesis for obtaining a master's degree in engineering.

The changes have been made based on updating the study course results, comparing the study course and study programme results and setting a vision that the master of the study programme, Wood Materials and Technology, must be a person who is able to manage the quality supervision

and development sector at least in the company of the sector eligible for the study programme and can establish product research, development, and innovation department.

**The final examination at the end of the study programme**

Development and defending of a master's thesis for obtaining a scientific degree of a master's in engineering materials and technology (in the sub-field Wood materials and technology of the science field Materials science). There have been no changes during the reporting period.

**Tuition fee per semester**

From academic year 2015/2016, the tuition fee per semester for full-time studies is 1070 euros.

Until academic year 2014/2015, the tuition fee per year for full-time studies was 1400 lats.

Tuition fees for students who study for a fee, are covered by natural or legal persons. Students also have the opportunity to use study credits.

**State-funded budget places**

From academic year 2015/2016, every year 10 study places of the study programme are financed from the state budget.

Until academic year 2014/2015, 25 study places financed from the state budget were allocated to the study programme together with other master's study programmes implemented at the Forest Faculty.

For full-time studies financed from the state budget, students are admitted by open competition in accordance with the regulations on the procedure for competition for state-funded study places at the Latvia University of Life Sciences and Technologies.

The changes have been made on the basis of the reorganisation of the master's studies at the Forest Faculty, as a result of which several master's study programmes have been closed or merged, creating two separate programmes.

## 1.2. Analysis and assessment of the statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.

Changes in the number of students in the master's study programme, Wood Materials and Technology, are indicated in Table 1.1.

Table 1.1

**Number of students**

| Study year | Number of students | Number of students depending on the source of funding | | Number of matriculated students | Number of ex-matriculated students | |
|---|---|---|---|---|---|---|
| | | Number of studying students using State budget funding | Number of studying students using private funding | | Number of graduated students | Number of students dropping out |
| 2012/2013 | 10 | 10 | 0 | 6 | 5 | 3 |
| 2013/2014 | 11 | 8 | 3 | 7 | 1 | 3 |
| 2014/2015 | 12 | 11 | 1 | 9 | 3 | 5 |
| 2015/2016 | 7 | 7 | 0 | 3 | 3 | 3 |
| 2016/2017 | 7 | 7 | 0 | 6 | 1 | 3 |
| 2017/2018 | 11 | 11 | 0 | 7 | 0 | 5 |
| 2018/2019 | 3 | 3 | 0 | 5 | 2 | 4 |
| 2019/2020 | 6 | 6 | 0 | 0 | 2 | 0 |
| 2020/2021 | 4 | 4 | 0 | 4 | 0 | 0 |

Number of students who have studied abroad within the exchange programme:

- In the academic year 2012/2013 – 1 (University of Eastern, Finland);
- In the academic year 2013/2014 – 1 (Mendel University of Agriculture and Forestry Brno, Czech Republic);
- In the academic year 2015/2016 – 3 (Rosenheim University of Applied Sciences, Germany);
- In the academic year 2016/2017 – 1 (Rosenheim University of Applied Sciences, Germany);
- In the academic year 2017/2018 – 1 (Rosenheim University of Applied Sciences, Germany);

Number of foreign students:

- In the academic year 2013/2014 – 1 (Sh. Ualikhanov Kokshetau State University, Kazakhstan), 4 (Ecole Supérieure du Bois, France);
- In the academic year 2014/2015 – 2 (Ecole Supérieure du Bois, France);

From academic year 2015/2016, every year 10 study places of the study programme are financed from the state budget. Considering that in none of the previous six study years the number of matriculated students has exceeded 10, all active students have studied using state budget funding. The state budget funding is no longer granted to students who have not fulfilled the

requirements of the study programme and who have been ex-matriculated at their own will, but these students are not part of the active students—they have been ex-matriculated.

It can be observed that there is a decrease in the number of students in the study programme, the possible causes of which are:

- decreased number of students in the professional bachelor's study programme, Wood Processing, which is the direct beginning of studies in the master's study programme, Wood Materials and Technology. Although other study programmes (bachelor's degree or second level professional higher education in Wood Processing, forestry, construction, architecture, and design) are also represented in the admission requirements of the master's study programme, primarily graduates of the study programme, Wood Processing, continue their studies at the higher level. but graduates of other eligible programmes are significantly less likely. Considering that the number of potential students legitimate for the admission requirements of the study programme has decreased, from which, moreover, the minority often chooses to continue higher level studies, the number of students in the master's study programme is also decreasing;
- Although the Latvia University of Life Sciences and Technologies is the only higher education institution in Latvia which implements a master's study programme directly in the field of wood processing, materials and technologies, establishment of similar study programmes in other educational institutions, which are of interest to the potential students based on others, not only direct factors of the acquired knowledge. For example, the region of the study, study costs, study infrastructure, which is also a factor to be assessed separately;
- inadequacy of infrastructure, as it can be assessed as dense, but not comprehensively sufficient. Improvements of buildings and laboratories have been made at the Department of Woodworking of the Latvia University of Life Sciences and Technologies, laboratories have been established for practical work with machine tools and instruments, however, in comparison of similar study field modernisation in other Latvian higher education and even secondary vocational education institutions, competitiveness is gradually declining. In addition, as the technologies used in the industry change and improve, for example, regarding automation, the introduction of robotic technologies and new materials, the quality implementation of the study programme may be difficult due to the lack of space for facilities to place machinery and equipment. The lack of premises is already noticeable, because often in the building where not only the master's study programme Wood Materials and Technology, but also the bachelor's study programme Wood Processing study process take place, there are not enough auditoriums and laboratories for the study process of all student groups.

### 1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.

The title of the master's study programme Wood Materials and Technology is directly related to the objective, tasks, content, result and degree of the study programme – Master Degree of Engineering in Wood Processing Technologies – because the title is based on Regulations of the Cabinet of Ministers No. 49 from 23 January 2018, Regulations on Latvian science fields and sub-fields corresponds to group 2. Engineering Sciences and Technologies field 2.5 Material Science

sub-field Wood Materials and Technology. The science degree in engineering corresponds to the study programmes of the field of material sciences, including the study programme, Wood Materials and Technology.

Admission rules for the study programme, Wood Materials and Technology, have been developed in the quality envisaged for achieving the planned study results, which determines the necessary prior knowledge for master's students (https://www.llu.lv/lv/magistra-studijas/koksnes-materiali-un-tehnologija - *in Latvian*).

The master's higher education study programme, Wood Materials and Technology, to be implemented at the Department of Wood Processing, Forest Faculty, Latvia University of Life Sciences and Technologies, has been implemented in accordance with the regulatory and strategic documents of the Republic of Latvia. The study programme and the developed plan comply with the Education Law and the regulations of the Latvia University of Life Sciences and Technologies on obtaining a master's degree at the Latvia University of Life Sciences and Technologies. The content of the study programme corresponds to the field of materials science, representing sub-fields of science: materials physics, intelligent materials and structures, wood materials and technology, polymers and composite materials, biomaterials, etc. Within the framework of the study programme, the objective and tasks of the Forest Faculty of the Latvia University of Life Sciences and Technologies are also implemented, which are defined in the regulations of the Forest Faculty.

The wood processing and recycling industry to which the study programme applies is one of the main areas of activity in the planning regions of Latvia; it is especially expressive in Riga and surrounding areas. Wood processing is also one of the cornerstones of the national economy, which is part of the Smart Specialisation Strategy of Latvia. The Ministry of Agriculture of the Republic of Latvia, as well as the Ministry of Education and Science, have delegated the Latvia University of Life Sciences and Technologies to develop this field of study for a more successful development of the overall economy of Latvia. Latvian Forest Industry Federation with its member associations: Latvian Association of Wood Processing Entrepreneurs and Exporters, Association Latvian Wood, Latvian Timber Producers & Exporters Association, Furniture Producers Association in Latvia, Latvian Cluster of Wood Construction, is a long-term supporter of this field of study. Accordingly, this field of study is a perspective from the point of view of studies and scientific development, which is based on technology transfer and approbation, investment in human resources, by developing new technologies and innovative materials. The study direction supporting the industry can be further developed by updating the study environment and preparing specialists in their field with qualifications, skills and competencies corresponding to the requirements of the industry.

Admission requirements for the study program: bachelor's degree or second level professional higher education in Wood Processing, forest industry, construction, architecture, and design. Although students who have graduated not only from the bachelor's level study programme Wood Processing, but also other related study programmes, can enter the study programme, because general study courses are also provided, within which students can equalise the level of knowledge on topics such as wood science and the value of the forest, as well as to renew knowledge corresponding to the academic level, the study courses included in the study plan are too specific to be fully mastered without prior knowledge. Consequently, there are no significant options to increase the scope of study programmes and directions of previous education that meet the admission requirements. In addition, it would not be rational to include study courses on the principles of wood processing, materials and technologies that are useful for graduates of other study programmes not directly related to wood processing, considering that the most important part of the accepted students is formed from graduates of the study programme, Wood Processing, who in some cases have indicated in surveys that, when starting studies in a master 's study programme, they face the repetition of some study courses or parts of them. The inclusion of study

courses on the principles of wood processing, materials and technologies in the master's study programme is not its goal either. This indicates that the number of the study courses that even the level of knowledge may already be too much for the graduates of the Wood Processing bachelor's study programme, but probably too little for the graduates of other study programmes who are potential applicants for the master's study programme.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

The topics included in the content of the study programme study courses are important for the Latvian economy, labour market needs and scientific trends, because the study courses have been updated on the basis of recommendations of industry experts. Industry experts, who are often also the potential employers of graduates of the study programme, most directly observe the current labour market trends. By implementing recommendations of industry experts in the study courses, which are based on the future development direction of the study programme, the compliance of the study programme with the needs of the labour market has been implemented. The leading lecturers of the study courses are also persons who carry out scientific activities at the university and other scientific institutions, implementing topical research on a national and international scale. Consequently, the content of study courses introduces the latest findings of the respective fields of science, thus promoting the development of the study programme and the achievement of study results. The wood industry is one of the leading industries in Latvia, with the fastest development in the years since Latvia's second independence. In the future, it is expected that its role in the Latvian economy will only increase. According to the guidelines of the European Union (EU) Forest-based Sector Technology Platform, the forest sector will play a key role in the sustainable development of Europe in 2030, based on competitive, innovative, and knowledge-based production and extensive use of renewable resources.

In order to update the study courses in accordance with the development trends of the industry, labour market and science, several co-operation agreements have been concluded between the leading Latvian forest industry companies and the Department of Wood Processing of the Forest Faculty of Latvia University of Life Sciences and Technologies on participation in the development and improvement of educational programmes, conducting research and scientific activities; organisation of internships and provision of internships. By concluding these cooperation agreements with LLU, the companies of the industry observe that Latvia University of Life Sciences and Technologies and its Forest Faculty provide the forest industry with highly qualified specialists, implementing appropriate higher professional and academic higher education study programmes, as well as use their scientific potential to solve significant problems. The updating of study courses

promotes the integration of science and production, implementation of research results, development of wood processing and a product quality compliance system, improvement of education of qualified employees and knowledge-based industry development, while Latvia University of Life Sciences and Technologies is interested in improving scientific potential and the quality of study programmes, to contribute to increasing the competitiveness of the forest industry with its scientific and technical potential. Cooperation agreements have been concluded with AS Latvijas Finieris, SIA Bolderāja, SIA MiTek Baltic and others.

The awarding of degrees is based on the sub-field Wood Materials and Technology of the science field Material Science, because the title of the master's study programme Wood Materials and Technology is directly related to the objective, tasks, content, results and degree of the study programme – Master Degree of Engineering in Wood Processing Technologies – and because the name, based on the Cabinet of Ministers Regulations No. 49 of 23 January 2018, Regulations on Latvian science fields and sub-fields directly corresponds to group 2. Engineering Sciences and Technologies field 2.5 Material Science sub-field Wood Materials and Technology. The science degree in engineering corresponds to the study programmes of the field of material sciences, including the study programme, Wood Materials and Technology. The content of the study programme Wood Materials and Technology corresponds to the field of Material Science, representing important science sub-fields (Latvian Council of Science 16.11.1999, decision No. 9-3-1): materials physics, intelligent materials and structures, wood materials and technology, polymers and composite materials, biomaterials, etc. The objective and tasks of the Forest Faculty of Latvia University of Life Sciences and Technologies are realised within the study program.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

Initially in the updating process, the objective, tasks and results to be achieved in the study programme are reviewed and defined, but then the responsible teaching staff is required to update the content of the study courses and the results to be achieved based on the relevant study programme indicators. By implementing such a practice, the desired result has been achieved – the results to be achieved in each individual study course are in accordance with the results to be achieved in the study programme and a situation has been achieved in which the study course indicators are subordinated to the study programme indicators. Regarding the improvement of study courses, the instructions of industry experts have been followed that the most demanded skills are technical, digital, planning and entrepreneurship, and that the most demanded areas of knowledge are work safety, planning, interdisciplinary communication – simultaneously with reviewing the content of the study programme, developing mapping of the study course, instructions are included in the content of individual study courses. None of the study courses can cover all the results of the study programme at the same time, thus each of the study courses achieves a certain part of the defined results of the study programme and only the combination of all courses creates preconditions for achieving the main results. Thus, each of the study courses is important to achieve the goal and results of the study programme, and they can be achieved only if the study programme plan contains the study courses that are currently included in it. The study

programme is based on the condition that it includes those study courses that are really necessary. Each of the study courses, except those that refer to the same thematic group (direction of specialisation) and continue in several semesters, is unique, therefore they cannot be interconnected, which is also not necessary, as it is not useful to include several study courses that have identical content. It is the differences in the content of study courses, that each assign certain competencies that are necessary to achieve the results of the study course and a vision, that the master of the study programme, Wood Materials and Technology, must be a person who is able to manage the quality supervision and development sector at least in the company of the sector eligible for the study programme and who is able and can establish a product research, development and innovation department.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

The number of students in the master's higher education programme, Wood Materials and Technology, is relatively small (up to 10 students). Thus, the studies of special study courses take place in the form of consultations and seminars with the lecturer of each study course. This aspect of studies allows for understanding the subject matter much more deeply in comparison with the basic studies. In general, this indicates a very large proportion of independent work in the master's studies.

Various teaching methods are used in the implementation and acquisition of the programme: lectures, seminars, tests, reports, conferences, but mostly individual and group work is used. To improve the study process, the lecturers have prepared lecture and practical work materials, which are available to master’s students and are also distributed via electronic data carriers.

Students have obligatory humanitarian and general education study courses. Specialisation begins with the choice of general and special courses of the specialty. Theoretical courses form almost half of the total amount of the study programme, but the rest is research practice, elaboration and defending the master's thesis.

The scientific research and academic activities of the Master's study programme, Wood Materials and Technology, are implemented in close cooperation with the Forest and Wood Products Research and Development Institute. Using the technical and scientific capacity of the institute, master’s students have access not only to a very modern laboratory complex and specific scientific and technical literature, but, most importantly, they are involved in the implementation of topical applied research ordered by the industry. Such a cooperation model is widely used in leading foreign universities, where modern laboratory equipment is available to the master’s students. Master's students, whose research work is related to the solution of wood chemistry problems and various specific problems of wood chemistry, perform the research part of the work at the scientific institute, Latvian State Institute of Wood Chemistry.

The support of study informative materials is provided by the Fundamental Library of Latvia University of Life Sciences and Technologies, the literature available to the lecturers, as well as the possibility to use the information resources of the Internet. Master’s students have wide

opportunities to use electronic sources of information for the development of scientific works.

Each year, a scientific conference of master's students is organised. At these conferences, master's students acquire not only research skills, but also the skills of presenting their research by preparing and reading reports. Elements of scientific research work are also included in the development of the master's thesis.

According to the Study Regulations approved by the Senate of Latvia University of Life Sciences and Technologies and the Regulations of Latvia University of Life Sciences and Technologies on obtaining a master's degree at the Latvia University of Life Sciences and Technologies, knowledge of students and master's students is assessed according to two indicators: qualitative and quantitative**.** For the qualitative assessment a 10-point scale criterion or rating—passed, failed—is used. The quantitative indicator is the amount of the study course in credit points. The examinations are tests, study papers ,and exams in accordance with the study plans approved for each study year.

The programmes prepared for each study course in the master's programme include not only the topics of lectures and seminars to be considered in the course, but also the forms and procedures for the examination of master's students.

The master's student takes the examinations in the professional foreign language and in the special profiling study course (complex examination – Wood materials and technology) at the commission. Master's examinations are received by the lecturer of the general education course and the general study courses of the specialty, who manages the studies in the respective study course. Primarily, the forms of examination that are practiced are written, oral, etc. The development of research in accordance with the methodology is controlled by the supervisor of the master's thesis. The knowledge evaluation system of the respective study course is described in the detailed programme of each study course and also in the information system of the Latvia University of Life Sciences and Technologies.

The master's thesis is an independent analytical piece of research with elements of scientific work, in which the master's student, based on the theoretical knowledge and practical skills acquired during the studies, carries out original research on current problems (according to the defined research directions) and develops specific proposals and recommendations significant for the society.

The master's thesis is first presented by the master's student in a pre-defence, which is organised as a scientific conference of the students and master's students of the Forest Faculty not later than three weeks before the defence of the thesis.

One week before the defence of the work, the compliance of the work with the formal requirements is determined and a decision is made to allow the defence of the work, as well as two reviewers of the work are appointed. Master's students, who are the candidates of the Master of Engineering academic degree, defend their master's theses with the Master's Examination Commission (MEC). MEC listens to the report of the master's student and answers to the questions asked, as well as to the feedback of the work supervisor and reviewers, and in a closed session decides on the awarding of the academic degree.

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education institution/ college supports the students within the study programme regarding the**

**fulfilment of the tasks set for students during the traineeship.**

## 2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.

The final thesis of the programme is an independent analytical research with elements of scientific work, in which the master's student, based on the theoretical knowledge and practical skills acquired during the studies, carries out original research on current problems (according to the defined research directions) and develops specific proposals and recommendations.

The topics of the study final theses selected by the master's students are topical, related to the industry and wood processing and various research programmes. Most often, the topics of the study final theses are related to the research of the features of construction materials and the expansion of the spectrum of use, for example:

- "Dependence of physical-mechanical features of pallet chip blocks on production technological parameters";
- "Research of Type I beam construction";
- "Features of wood and geopolymer composite material and possibility of application in wall panels";
- "Fire safety and durability of wooden facades in outdoor exploitation conditions";
- "Features of aspen wood tool handles glued in length";
- "Resistance of glued wooden construction finishing systems to outdoor exploitation conditions";
- "Production of thermal insulation material from wood fibres";
- "Monitoring of pedestrian wooden bridge structures in Langervalde urban forest".

During the reporting period, there were different typical topics of final theses related to the research on a new and innovative cellular wood material (“dendrolight”), which, at that time, was the most topical wood product for which the search of the most suitable use only began and which was industrially produced only in Latvia, e.g.:

- "Physical and mechanical features of pine (*Pinus sylvestris L*) cellular wood material";
- "Research of cellular wood material furniture combinations";
- "Effect of moisture of cellular wood material on stability of the shape";
- "Fire safety of pine cellular wood material and possibilities of its improvement";
- "Research of building elements from cellular wood material".

Regularly, several topics of final theses are developed in relation to the research on one of the most promising and valuable wood materials produced in Latvia – plywood. Also in the reporting period, topical study final theses on the features of plywood and research of new uses have been developed, in which the findings are useful for implementation in production, for example:

- "Influence of relative air humidity on physical and mechanical properties of plywood";
- "Mechanical features of bars glued in birch plywood";
- "Quality of birch plywood gluing depending on changes in production technological regimes";

- "Influence of technological parameters of plywood pressing on the mechanical properties in static bending".

In the reporting period, several final theses have been related to the research of wood materials and product production technologies, for example:

- "Possibilities of making curved wooden floor coverings";
- "Chip quality control and determination in SIA Dobeles Eko".

The student work research is also related to the research problem of a particular company; thus, the respective topic is related to the development tasks of the region represented by the respective company. So far, joint research has been carried out with the leading research institutes—Latvian State Institute of Wood Chemistry, SIA Forest and Wood Products Research and Development Institute, as well as Riga Technical University, and the results of the research are joint publications and presentations at national and international conferences. Every year, master students participate in the work of scientific conferences of students and master's students of the Forest Faculty and report on their research, as well as after the conference, master's students submit the theses for publication.

The close cooperation of the industry with the union of associations—the association Latvian Wood Industry Federation—has promoted the long-term development of the study programme and topicality of final theses. The established cooperation helps graduates to find career opportunities in the industry in which they have obtained a qualification. The number of specialists prepared each year meets the demand. Graduates are employed in their specialty or related industries, such as construction. The opinion of employers and professional organisations in the industry is expressed by the established Forest Faculty Advisors Convention, which represents AS Latvijas Finieris, association Latvian Forest Industry Federation, Ministry of Agriculture of the Republic of Latvia, AS Latvijas Valsts meži, and Latvian State Forest Research Institute Silava.

The potential employers of the graduates of the study programme are:

- representatives of the association Latvian Forest Industry Federation and its members;
- companies of natural persons in the wood sawing, wood processing and furniture industry, who are not the members of associations and unions;
- AS Latvijas Valsts meži;
- higher education institutions, mainly the Forest Faculty of the Latvia University of Life Sciences and Technologies;
- scientific institutes of the field (SIA Forest and Wood Products Research and Development Institute and Latvia State Institute of Wood Chemistry).

The scientific research and academic activities of the Master's study programme, Wood Materials and Technology, are implemented in close cooperation with the Forest and Wood Products Research and Development Institute. Using the technical and scientific capacity of the institute, master's students have access not only to a very modern laboratory complex and specific scientific and technical literature, but, most importantly, they are involved in the implementation of topical applied research ordered by the industry. Such a cooperation model is widely used in leading foreign universities, where modern laboratory equipment is available to the master's students. Master's students, whose research work is related to the solution of wood chemistry problems and various specific problems of wood chemistry, perform the research part of the work at the scientific institute Latvian State Institute of Wood Chemistry.

Master's students, who are the candidates of the degree corresponding to the master's study program, develop and defend their master's theses with the Master's Examination Commission (MEC). MEC listens to the final reports of the master's student and answers to the questions asked,

as well as to the feedback of the work supervisor and reviewers, and in a closed session decides on the awarding of the degree. The final theses are evaluated with a mark.

## 2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.

In order to evaluate the study programme, a survey of 1st and 2nd year students was conducted in 2013 and 2014. The results of **student surveys** indicated that the majority of students have not been satisfied with the study courses offered in the respective study year in the general course block, justifying their opinion on the fact that there are too many non-wood processing and non-industrial courses in the study programme, that are not directly related to the study programme. The students have recommended updating the content of the study programme by including study courses that are directly applicable to the corresponding study programme. Based on the results of the survey conducted at the begining of 2018., after the study programme update plan (changes in the study programme, which the applicants acquire, starting from the academic year 2015/2016), it was found that students' satisfaction with study courses and their content has significantly increased and that a successful solution is to develop a master's thesis within research projects, which allows for reducing the costs necessary for practical research, as well as to present research results at scientific and practical conferences. The students also have an easier-to-understand study plan and possibly fewer tests and exams to take, which also reduces the potential that study courses have not successfully passed.

**The opinion of the graduates** about the study program is observed on the basis of the feedback of the employers because these employers are mostly also the graduates of the respective study program. In general, graduates highly value both theoretical and practical knowledge acquired while studying in the study program "Wood Materials and Technology". Employers acknowledge that the level of preparation of the graduates of the Faculty of Forestry is good, emphasizing that practical thinking and implementation must be integrated into the acquisition of theoretical knowledge, including from the economic point of view. The acquired knowledge allows graduates after a short period of adaptation to successfully work in various companies in the wood industry. The opinion of students, academic staff and involved groups (employers, professional organizations, etc.) has shown that the existing material and technical resources for the implementation of the study program are currently sufficient, but without further development opportunities, as a result of limited financial resources. Employers and graduates also emphasize that students who have graduated not only from the bachelor's study program "Wood Processing", but also other related study programs can enter the study program, therefore it is useful to have general study courses provided by the study program. the level of knowledge on such topics as wood science and the value of the forest, as well as to renew the knowledge corresponding to the academic level in such study courses as philosophy of science, preparation of research papers and use of mathematical methods. The inclusion of such study courses in the study program plan is also positively assessed by those students who start their studies for a certain longer period of time after the stage of obtaining the previous higher education.

The recommendations made in the international expert and employer evaluation carried out in 2017 and 2018 are presented in Table 2.6.1.

Table 2.6.1.

**Recommendations of evaluation by international expert and employer**

| Recommendation | Characteristics and argue |
|---|---|
| Insufficient opportunities to continue studies and financial guarantees | Solutions for international cooperation have been sought together with Kaunas University of Applied Sciences (Kaunas College) and Tallinn University of Technology TalTech University. Possibilities of using the material and technical base have been sought in cooperation with Jelgava Technical School and industry companies. |
| Cooperation with other Latvian and foreign higher education institutions should be improved | Several lecturers have been involved in other Latvian and foreign higher education institutions as guest lecturers, thus promoting cooperation. Cooperation has also been promoted in the preparation of joint project applications, both in connection with the development of the Latvian Science Council and international projects' competitions. During the reporting period, active exchange of experience of teaching staff with higher education institutions of neighbouring countries was continued, including within the framework of the ERASMUS + program. Work has continued at InnovaWood module bank on the placement of study materials. |
| Practical training opportunities need to be increased | The training base created and planned to be developed in the coming years at the Department of Woodworking is the basis for the development of students' practical skills. SIA Forest and Wood Products Research and Development Institute in the study process and development of diploma theses, master's and doctoral theses, provides support in the implementation of the research-practical part. Most of the final theses have been developed with the support of companies in the field, both practical and financial. |

| Recommendation | Characteristics and argue |
|---|---|
| To create a more open study system | The teaching staff has a high professional competence, which is always ready to help students in various study issues. The teaching staff is starting to make the study courses more interesting and easier to understand, attracting various professionals in the field as guest lecturers. Students have the opportunity to use e-learning and other resources that act as free open education resources, where study and research materials are available - books, lectures, etc. In the Wood Machining Laboratory of the Department of Woodworking, after mastering theoretical studies, students can improve their skills in practice by acquiring and working with woodworking equipment, making wood products of different degrees of complexity. It is implemented under the direct supervision of the head of the laboratory, taking into account all issues related to labor protection. Students are also involved in activities related to the promotion of the industry, such as the Scientists' Night, summer school, etc. |
| The development of final theses needs to be improved | The elaboration of the final theses takes place in accordance with the developed regulations on the structure and design of the final theses. |

Based on the evaluation of industry experts conducted in 2019, it is concluded that the aim of the academic master's study program "Wood Materials and Technology" is to ensure graduate readiness for leading scientific research and academic work in the chosen field. However, in practice it can be seen that the study program is also demanded from specialists already working in the field who want to improve their competencies. Seeing how much the role of corporate research and development projects currently manufacturing processes improved efficiency by reducing the need for manual labor in the future at least one study specialization direction should address the processes and the technologies that they are used. As the availability of labor decreases, it would be important to develop such study programs that allow specialists already employed in production (including previous graduates of the study program) to improve their competencies, while maintaining the opportunity to work. It is recommended to create a shorter (implementation time up to 2 years) study program based on the work environment, which would allow updating the knowledge in industry-specific production processes, as well as improving the business management, personnel management, process and quality management competencies of employees. Useful proposals are implemented in the implementation of the study program.

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

Within the study process, ERASMUS + cooperation agreements have been concluded with several foreign universities, such as the École Supérieure du Bois (France), Mendel University in Brno (Czech Republic), Transylvania University (Romania), etc., and students actively used this opportunity to study abroad until the academic year 2018/2019. Foreign students, mainly from the École Supérieure du Bois (France), have also chosen to study the semester at the Department of Woodworking of the Latvia University of Life Sciences and Technologies.

Number of students who have studied abroad within the exchange programme:

- In the academic year 2012/2013 – 1 (University of Eastern, Finland);
- In the academic year 2013/2014 – 1 (Mendel University of Agriculture and Forestry Brno, Czech Republic);
- In the academic year 2015/2016 – 3 (Rosenheim University of Applied Sciences, Germany);
- In the academic year 2016/2017 – 1 (Rosenheim University of Applied Sciences, Germany);
- In the academic year 2017/2018 – 1 (Rosenheim University of Applied Sciences, Germany);

Number of foreign students:

- In the academic year 2013/2014 – 1 (Sh. Ualikhanov Kokshetau State University, Kazakhstan), 4 (Ecole Supérieure du Bois, France);
- In the academic year 2014/2015 – 2 (Ecole Supérieure du Bois, France);

The study courses that students acquire during mobility are selected taking into account both the students' wishes and the relevance of the study courses. The recognised study courses must correspond to the amount of credit points and, as much as possible, also to the content compared to the equivalent study courses, so that students do not have to take additional study courses. This prevents situations where students may have outstanding study courses or even situations where it would be considered that the student does not meet the requirements of the study programme, even though the student constantly participates in the study process.

It can be observed that the number of students who use mobility opportunities is decreasing (both the number of students who have studied abroad within the framework of the exchange programme, as well as the number of foreign students). The possible reasons are:

- establishment of similar study programmes in foreign educational institutions, which are attractive to the potential foreign students, based, for example, on a more desirable country of study, study costs and wider study infrastructure;
- the level of foreign language use of the teaching staff involved in the study programme, which is probably the most important factor that reduces the interest of foreign students to choose this study programme. The level of foreign language knowledge of teachers is not a problematic factor, but their use in practice and the absence or insufficient existence of study materials prepared in foreign languages;
- most of the potential foreign students may not be informed about the study opportunities in this study programme;
- Insufficient level of authority of the Latvia University of Life Sciences and Technologies and the State of Latvia in comparison with other universities and countries where they are located;
- the reluctance and anxiety of the students in the study programme about the sufficiency of the level of knowledge of a foreign language in order to fully use the study opportunities abroad within the framework of the student exchange programmes;
- inadequacy of infrastructure, as it can be assessed as dense, but not comprehensively sufficient. Improvements of buildings and laboratories have been made at the Department of Woodworking of the Latvia University of Life Sciences and Technologies, laboratories have

been established for practical work with machine tools and instruments, however, in comparison of similar study field modernisation in other Latvian higher education and even secondary vocational education institutions, competitiveness is gradually declining.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

An important condition for the implementation of the study process is the provision of premises, the capacity of laboratory premises and their equipment. The study process takes place on the premises of the Forest Faculty of the Latvia University of Life Sciences and Technologies (Akadēmijas iela 11), but some courses are also implemented in other buildings of the university, such as the Faculty of Engineering (Čakstes bulvāris 5), the Faculty of Agriculture (Akadēmijas iela 19), Faculty of Economics and Social Development (Svētes iela 18), in the main building of the university (Lielā iela 2)

The Department of Wood Processing of the Forest Faculty of the Latvia University of Life Sciences and Technologies has a wood scientific laboratory, which has equipment for determining physical-mechanical and physico-chemical and mechanical features of wood.

Table 3.1.1.

**Tools, machines and equipment available to students during their studies**

| Function | Equipment | Utilisation |
|---|---|---|

| | | |
|---|---|---|
| Determination of physico-mechanical features of wood | Instron KN600 equipment for determining the mechanical features of construction materials.<br>Equipment for determining the mechanical features of wood-based materials Instron 5967.<br>Wood strength meter Timbergrader MTG.<br>Wood moisture meter BROOK-BFMD6 with universal sensor and sensor for determination of chip moisture. | For large specimens with a maximum load of 600 kN, length up to 7.0 m, width 200 mm, thickness up to 400 mm, determining the features of elasticity and strength in compressing, stretching and bending; tests of mechanical properties of small samples by bending, stretching, stretching and sliding; for non-destructive testing of wood using the speed of sound movement; for determination of moisture of wood and wood materials (plywood and bulk materials) in accordance with the standards EN 13183-1; 13183-2, 13183-3. |
| Determination of physico-chemical features of wood | Cone Calorimeter. | Determination of fire reaction of wood and wood-based materials according to the ISO 5660 standard. |
| Determination of material surface features | Adhesion tester kit PosiTest<br>Scratch resistance tester ERICHSEN 413. | For the determination of the reaction to fire of wood and wood-based materials in accordance with ISO 5660; for the determination of the adhesion properties of wood finishing materials. |
| Preparation of materials | Climate camera Memerth.<br>Water boiling equipment.<br>Air conditioning system NAUR.<br>Drying cabinets Memerth. | Equipment for equalisation and holding the samples equilibrium moisture prior to testing; equipment for holding wood samples in water at a boiling temperature under normal conditions; equipment for the prior holding of wood samples before the performance of the tests, if the materials are intended to be used in wet conditions. |

| | | |
|---|---|---|
| Analysis of construction products and emission materials | Volatile substance analysis equipment set E-WK I 1000, Wiess Technik. | Equipment for the analysis of emissions of construction products and materials for the determination of the composition and amount of volatile organic compounds in construction products and their suitability for the needs of the construction process. |
| Grinding of hard, brittle, and fibrous materials | Sample mill Retsch RM200. | Ball mill for pulverising, homogenising, and colloidal milling of soft, hard, breakable and fibrous materials |
| Thermal inspection of buildings and structures | Thermograph Testo 882. | Determination of heat loss in buildings and structures. |
| Determination of melting point | Ash melting temperature measuring equipment Misura 3 HSMN, Exspert System Solutions. | Determination of the melting point of substances up to 400 °C. |
| Determination of deformations | Deformation meter IDC-1 1242. | Determination of linear dimensional changes. |

| | | |
|---|---|---|
| Wood processing, sample preparation | Universal format ripsaw machine Altendorf F45.<br>Computer Numerical Control machine with mechanical cutting device VHF.<br>Computer Numerical Control machine with laser cutting device Trotec Speedy 400.<br>Planer-Thicknesser machine FELDER AD 951.<br>Universal milling machine MAKA SF-4500.<br>Wide belt sanding machine SCM sandya 300.<br>Material gluing press S&S Maschinenbau GmbH VS 2000.<br>Vacuum press Istra-A VP-3000.<br>Glue application machine GST-300.<br>Edgebanding and processing equipment set FELDER G.<br>Multi-spindle drilling machine Vitap ALFA21.<br>Horizontal single shaft drilling machine HOLZMANN LBM 290.<br>Vertical band saw FELDER FB 540.<br>Horizontal band saw for sawing logs Tehnika Auce ZBL-60HM.<br>Hand power tools FESTOOL.<br>Sharpening equipment for cutting tools.<br>Dynamometer.<br>Water softening equipment UB 178.<br>High speed camcorder kit. | Machine tools and equipment for woodworking and sample preparation for testing. |

The execution of the study process laboratory and practical work takes place also in cooperation with SIA Forest and Wood Products Research and Development Institute, which is the most modern laboratory complex of this type in the Baltic States. For the needs of the study process, the company's equipment is also available and it consists of the following items:

- glued joint test equipment set (delamination);
- accelerated material ageing climate chamber;
- fire resistance testing equipment FTT SBI;
- furniture test stand for tests of chair stability, cabinet furniture, beds, mattresses, furniture doors, drawers;
- mechatronics laboratory equipment Festo Didactic;
- printing machine HP DesignJet 800;
- biofuel shredder;
- calorimeter 6200;
- thermal camera Nabertherm;
- small flame test apparatus;
- drying cabinets;
- impact strength tester ZEHNTNER ZIT;
- sawn timber drying chamber;
- granule tester MATADOR 50HZ STD.2;
- granule press.

The adequacy of the infrastructure can be assessed as tolerable, but not comprehensively sufficient. Improvements of buildings and laboratories have been made at the Department of Wood Processing of the Latvia University of Life Sciences and Technologies, laboratories have been established for practical work with machine tools and instruments, however, in comparison of similar study field modernisation in other Latvian higher education and even secondary vocational education institutions, competitiveness is gradually declining. In addition, as the technologies used in the industry change and improve, for example, regarding automation, the introduction of robotic technologies and new materials, the quality implementation of the study programme may be difficult due to the lack of space for facilities to place machinery and equipment. The lack of premises is already noticeable, because often in the building where not only the master's study programme Wood Materials and Technology but also the bachelor's study programme Woodworking study process take place, there are not enough auditoriums and laboratories for the study process of all student groups. In order to solve the shortage of laboratories and premises, in 2021, the construction of a new laboratory building was started, which was implemented in project No. 1.1.1.4./17/I/003 titled Strengthening of research, development infrastructure and institutional capacity of Latvia University of Life Sciences and Technologies and scientific institutions under its supervision.

In the premises allocated for the study process, students acquire both practical skills in wood processing, as well as perform laboratory and practical work in all study courses included in the study programme, as well as perform scientific research. The machines and equipment in the laboratories improve the material and technical equipment of the department and, at the same time, the acquisition of theoretical study courses. The number of workplaces in all laboratories corresponds to the number of students in laboratory workgroups. The students of the department have a computer class with 10 workplaces. It is practice using the latest software within the study courses, for example, Computer-aided Design, Fundamentals of Computer Numerical Control Machines in Woodworking, Wooden Constructions, etc.

Students have the opportunity, using the e-environment and e-learning tools, to study independently and communicate with the academic staff electronically. Study materials are placed in an e-studies system created by Latvia University of Life Sciences and Technologies (in the Moodle environment), which is available on the website: https://estudijas.llu.lv/?lang=en Students and lecturers have access to the library of Latvia University of Life Sciences and Technologies with a wide range of special literature and access to various databases https://llufb.llu.lv/en, as well as

materials and scientific literature compiled by lecturers, which are in the collections of faculties, departments, institutes or lecturers. Various options are available for the search of information (for example, AGRIS database; databases created by Latvia University of Life Sciences and Technologies fundamental library staff: Electronic catalogue of the Latvia University of Life Sciences and Technologies Fundamental Library, Publications of Latvia University of Life Sciences and Technologies lecturers and researchers, Doctoral theses defended in Latvia University of Life Sciences and Technologies, Master's theses in Latvia University of Life Sciences and Technologies and Articles of Latvia University of Life Sciences and Technologies journals and conferences; Electronic catalogues of Latvia University of Life Sciences and Technologies information centres and information offices; subscribed databases: E-journals, E-books: CAB Abstracts, CABI Animal Health and Production Compendium, CABI Crop protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO database, EBSCO eBook Academic Collection, Newspaper library, Letonika, ScienceDirect journals, Scopus, Escival, Web of Science, Wiley Online. In addition, information search engines and portals are available (for example, CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer LINK, etc.).

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture and the Latvia University of Life Sciences and Technologies. The tripartite agreement on funding for **2020** stipulates that the basic cost of one study place is 1518.98 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme "Wood Materials and Technology" is 1.8 (Regulation of the Cabinet of Ministers “Procedures for Financing Higher Education Institutions and Colleges from the State Budget”), costs per student in the master's programme “Wood Materials and Technology” amount to 4264.89 EUR.

Every year, the Senate of the Latvia University of Life Sciences and Technologies approves the distribution of revenues and expenditures of the general budget structure of the Latvia University of Life Sciences and Technologies, prepared in accordance with the Saeima annual law “On the State Budget” The control and audit of the general budget is performed by an independent sworn auditor, whose opinion and review report is reviewed and approved by the Senate.

Before approving the distribution of Latvia University of Life Sciences and Technologies general budget revenues and expenditures in the Senate, it is reviewed, discussed and approved by the Working Group on Resource Use and Development, which consists of Rector, Vice-Rectors, Chancellor, Latvia University of Life sciences and Technologies Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant head of the centre, key economists, key specialists in real estate and legal issues.

The distribution of income and expenses approved by the Senate of the Latvia University of Life Sciences and Technologies determines that 80% of the funding allocated from the state consists of remuneration costs and 20% other costs. 60% of the paid study funding consists of reimbursement costs and 40% other costs, of which 20% are directly at the disposal of the faculty that implements the respective study programme. The amount of funding for the science base is calculated and allocated annually from active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

The tuition fee for the programme is € 2140 per year for Latvian residents.

The total distribution of the total budget of Latvia University of Life sciences and Technologies is formed by the estimates of structural units/faculties, where costs are estimated by type of expenditure.

The share of costs of the master's study programme "Wood Materials and Technology" in Year 2020 consists of:

• Remuneration - 72%

• Scholarships - 7%

• Goods and services - 17%

• Share capital formation - 4%

For comparison, state funding by years in the master's study programme "**Wood Materials and Technology**".

**In 2019** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1518.98 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.8, the cost per student in the master's programme “Wood Materials and Technology” is 4264.57 EUR.

**In 2018** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1458.51 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.8, the cost per student in the master's programme “Wood Materials and Technology” is 4100.64 EUR.

**In 2017** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1393.33 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.8, the cost per student in the master's programme "Wood Materials and Technology" is 3926.00 EUR.

**In 2016** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.8, the cost per student in the master's programme “Wood Materials and Technology” is 3204.21 EUR (in 2016, funding was only 84.45564% for the provision).

**In 2015** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.8, the cost per student in the master's programme “Wood Materials and Technology” is 3204.42 EUR (in 2015, funding was only 84.46058% for the provision).

**In 2014** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1333.11 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost coefficient for the master's programme “Wood Materials and Technology” is 1.7, the cost per student in the master's programme “Wood Materials and Technology” is 3010.67 EUR (in 2014, funding was only 83.7295803% for the provision).

**In 2013** tripartite agreement on state funding for study programmes stipulates that the basic cost of one study place is 1333.36 EUR, the study level coefficient for master's programmes is 1.5 and the social security of the study place for master's programmes is 164.34 EUR, the study cost

coefficient for the master's programme “Wood Materials and Technology” is 1.7, the cost per student in the master’s programme “Wood Materials and Technology” is 3032.28 EUR

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

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

Currently, 16 lecturers are active in the implementation of the study programme, of which 13 have a doctoral degree, and 3 persons have a master's degree. During the reporting period, there have been no significant changes in the number of lecturers, but the number of lecturers with a doctoral degree has increased. In addition, all those lecturers who currently have a master's degree, continue their studies at the doctoral level, therefore it is expected that in the near future all lecturers of the study programme will be Doctor of Science. The relatively large number of Doctor of Science in the teaching staff indicates the competence of the teaching staff and promotes the introduction of the latest findings of the respective fields of science in the courses of the study programme.

The composition of the teaching staff is very stable, as the number has only varied by one teacher since 2013 (in the academic year 2020/2021 there are 16 members of teaching staff, in the academic year 2019/2020 – 16 members of teaching staff, in the academic year 2018/2019 – 16 members of teaching staff, in the academic year 2017/2018 – 17 members of teaching staff, in the academic year 2016/2017 – 17 members of teaching staff, in the academic year 2015/2016 – 17 members of teaching staff, in the academic year 2014/2015 – 17 members of teaching staff, in the academic year 2013/2014 – 16 members of teaching staff).

The number of teaching staff is considered sufficient, because the number of study courses envisaged in the study programme, combining them into thematic groups, is also 16. Thus, each thematic group of study courses is led by one lecturer who is competent in the respective topic, thus ensuring appropriate study quality. In addition, the number of students is regularly lower than the number of lecturers.

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

**how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.**

Currently, 16 lecturers are active in the implementation of the study programme, of which 13 have a doctoral degree, and 3 persons have a master's degree. The relatively large number of Doctor of Science in the teaching staff indicates the competence of the teaching staff and promotes the introduction of the latest findings of the respective fields of science in the courses of the study programme. Of the currently active teaching staff of the study programme, 2 are guest lecturers, 1 is a lecturer, 5 are guest docents, 3 are docents, 2 are associate professors, 3 are professors. In addition, 8 are also leading researchers. The number of Doctor of Science in the composition of the teaching staff is considered to be sufficient and it indicates the competence of these teaching staff in the processes of creating and teaching the content of study courses. Considering that several lecturers are also leading researchers, it can be concluded that the content of study courses introduces the latest findings of the respective fields of science, because lecturers lead and participate in the development of current research, thus promoting the development of the study programme and achievement of study results. The qualification of the involved teaching staff complies with the requirements of regulatory enactments. Considering that the Doctor of Sciences is the highest possible level of education, the quality of studies of the study courses conducted by the teaching staff who have acquired the Doctor of Science level also has the highest possible level.

The number of staff is indicated in the table. The number of staff, depending on the positions of teaching staff, has changed insignificantly since 2013 (in the range of one person in each job category), which is related to termination of professional activities of certain teaching staff, attraction of new teaching staff, re-election of existing teaching staff. Only the number of lecturers corresponding to the position of the leading researcher has changed significantly (it has increased four times since 2013), which can be explained by the fact that the university has introduced a salary motivation system, which provides additional remuneration if lecturers also participate in scientific research that includes the status of an elected principal researcher or researcher. In addition, it increases the competence of the teaching staff and the probability that the students in the study process are provided with the latest findings obtained in the scientific research performed by the teaching staff.

Table 4.2.1.

**Staff**

| Position | 2020/2021 | 2019/2020 | 2018/2019 | 2017/2018 | 2016/2017 | 2015/2016 | 2014/2015 | 2013/2014 |
|---|---|---|---|---|---|---|---|---|
| Professors | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Associate professors | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| Assistant professors | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| Guest assistant professors | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 |
| Lecturers | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Guest lecturers | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| **Total**<br>**From these:** | **16** | **16** | **16** | **17** | **17** | **17** | **17** | **16** |
| Leading researchers | 8 | 8 | 5 | 4 | 3 | 2 | 2 | 2 |

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

The scientific activities of the academic staff are closely related to the study courses taught by them. Moreover, real progress in production is impossible without scientific achievements and lessons learned. The academic staff implements research projects on a national and international scale, for example:

- Project of the State research programme “Sustainable use of local resources (subsoil, forest, food and transport) – new products and technologies”;
- Research Centre for Forest and Water Resources of National Importance, cooperation partners Latvian State Institute of Wood Chemistry, LVMI Silava, University of Latvia, Daugavpils University, Latvian Institute of Aquatic Ecology;
- development of innovative self-supporting panels and building elements from honeycomb wood material. VIAA, No. 2010/0248/2DP/2.1.1.1.0/10/APIA/VIAA/019, funding has been attached to SIA Forest and Wood Products Research and Development Institute;

- research of wood materials of increased ecological value, LIAA, No. L-KC-11-0004, funding is attached to SIA Forest and Wood Products Research and Development Institute;
- establishment of large-scale wood construction research infrastructure, VIAA, funding is attached to SIA Forest and Wood Products Research and Development Institute;
- monitoring of forest sector energy production (2013), Ministry of Agriculture of the Republic of Latvia Forest Development Fund, financing attached to SIA Forest and Wood Products Research and Development Institute;
- users of energy wood resources and users of non-renewable resources in Latvia, AS Latvijas Valsts meži, financing is attached to SIA Forest and Wood Products Research and Development Institute;
- research of modern and sustainable wooden constructions, AS Latvijas Valsts meži, funding is attached to SIA Forest and Wood Products Research and Development Institute.

ERASMUS + agreements on the mobility of academic staff have been concluded with the University in France and with the Polytechnic University of Madrid (Universidad Politécnica de Madrid), Madrid, Spain, etc. The lecturers have gone to ERASMUS + mobility to the École Supérieure du Bois (France), Poznan University of Technology (Poland), etc. universities, both giving lectures and improving their professional mobility. The lecturers have given several lecture courses at Aleksandras Stulginskis University (Lithuania). The academic staff is also involved in the review of foreign scientific monographs – doctoral theses, doctoral students from the Estonian University of Life Sciences (Estonia), Vilnius Academy of Arts (Lithuania), etc. Several individuals have been involved in peer-reviewing scientific articles in scientific journals, such as the European Journal of Wood and Wood Products, Drvna industrija, Baltic Forestry, Agronomy Research and others.

Within the framework of the projects, scientific cooperation has been established with the Italian institute of wood science Bioeconomy Institute CNR-IBE, developing research sections within the framework of the doctoral thesis and publishing joint scientific articles.

Teachers use knowledge-based experience in teaching methods, which has developed through research within the project of the Forest industry competence centre. Colleagues provide representation and activities in scientific associations: COST Action FP1404 – Fire Safe Use of Bio-Based Building Products, COST Action FP1407 - Understanding wood modification through an integrated scientific and environmental impact approach. The teaching staff participates in the professional organisation EGOLF, which is related to the field of determining the characteristics of fire during combustion. The Department of Woodworking is a full member of InnovaWood. In connection with the involvement of the new generation, high school students or prospective students, the teaching staff has acted as supervisors or consultants in the development of students' scientific and practical works.

The work continues in the Technical committee Timber of the Latvian National Centre of Standardisation. Opportunities for professional development are promoted by representing the State Examination Commissions in several vocational secondary schools and technical colleges. The launched ERASMUS + project, in cooperation with colleagues from Estonia and Lithuania, helps to increase the qualification of the involved teachers by strengthening the mutual exchange of views, acquired knowledge and skills tested in companies, which are also used to improve the study content. Thus, examples of work-based education have also been introduced in the improvement of the study environment of the study programme.

**4.6. Assessment of the cooperation between the teaching staff members by specifying the mechanisms used to promote the cooperation and ensure the interrelation between the**

**study courses/ modules. Specify also the proportion of the number of the students and the teaching staff within the study programme (at the moment of the submission of the Self-Assessment Report).**

Internal conferences are provided for the promotion of mutual cooperation of the teaching staff involved in the study programme, where it is possible to organise discussions on the content of study courses and teaching staff practice in the study process (for example, theory and practical, division of laboratory work, preparation of teaching materials, their formats and transfer to students, types of independent work and solutions for their organisation, tests, their types and structure, assessment system). Mutual discussions are considered to be an effective tool for improving the content of study courses a, linking them with the objectives, tasks and results of the study programme. The conferences also include visits to the industry and cross-industry companies corresponding to the study programme, so that the teaching staff involved in the study programme, including those whose professional activities are not directly related to the nature of the study programme, get acquainted and better understand the study programme. Topical issues are also discussed in the staff meetings of the institution to which the study programme is directly subordinated. Considering that not only the staff working in the master's study programme, but also the staff working in the bachelor's and doctoral study programmes participate in the meetings, it is possible to form a broader discussion on the interconnection of study programs of all higher education levels in the relevant field and to make strategic decisions.

Considering that the number of students in the study programme is currently 4 students, but currently 16 educators are actively involved in the implementation of the study programme, the ratio of students to educators (persons) is 0.25 students in relation to one educator, which indicates that the number of students is less than number of educators. In contrast, the ratio of students to teaching staff (staff positions) in 2020./2021. year, taking into account the number of students (4) and the number of staff positions (0.57), is 7.017.

# Annexes

| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
|---|---|---|
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | 5_2-Statistical_data_of_students-Wood_materials_and_technology.docx | 5_1-Statistikas_dati_par_studejosajiem-Koksnes_materiali_un_tehnologija.docx |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | 6_2-Compliance_of_study_programme-Wood_materials_and_technology.docx | 6_1-Atbilstība_valsts_izglitibas_standartam-Koksnes_materiali_un_tehnologija.docx |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | 8_2-Mapping_of_study_courses-Wood_materials_and_technology.docx | 8_1-Studiju_kursu_kartejums-Koksnes_materiali_un_tehnologija.docx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | 9_2-Plan_of_the_study_program-Wood_materials_and_technology.docx | 9_1-Studiju_programmas_plans-Koksnes_materiali_un_tehnologija.docx |
| Descriptions of the study courses/ modules | 10_2-Descriptions_of_courses-Wood_materials_and_technology.pdf | 10_1-Kursu_apraksti-Koksnes_materiali_un_tehnologija.pdf |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | Diploms_koksne_mag_EN.pdf | Diploms_koksne_mag_LV.pdf |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | Vienosanas_LLU and RTU_Production and processing_EN.docx | Vienosanās_LLU un RTU_Razosana_parstrade.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | | |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Sample (or samples) of the study agreement | 17_2-Study_agreement-Wood_materials_and_technology.pdf | 17_1-Studiju_ligums-Koksnes_materiali_un_tehnologija.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | mag_stud_progr_Koksnes materiāli un tehnoloģija_AIP atzinums_EN.docx | mag_stud_prog_Koksnes materiāli un tehnoloģija_AIP atzinums.edoc |

# Food Quality and Innovations (43541)

| | |
|---|---|
| Study field | *Manufacture and Processing* |
| ProcedureStudyProgram.Name | *Food Quality and Innovations* |
| Education classification code | *43541* |
| Type of the study programme | *Academic bachelor study programme* |
| Name of the study programme director | *Dace* |
| Surname of the study programme director | *Kļava* |
| E-mail of the study programme director | *dace.klava@llu.lv* |
| Title of the study programme director | *Dr.sc.ing.* |
| Phone of the study programme director | *+37163005673* |
| Goal of the study programme | *The aim of the academic bachelor's study programme is to prepare a competitive and knowledgeable specialist in food production, quality and innovation, who is able to organise quality management and innovation development in food companies, to carry out creative research and to form the basis for further in higher-level studies.* |
| Tasks of the study programme | *1. Provide and develop a competitive study environment and lecturer qualifications in order to implement a student-centred and competence-based approach in the fields of food production, quality management and innovation in higher education.*<br>*2. Provide a modern research environment and promote the involvement of students in the implementation of scientific research projects in order to develop the skills to plan independently the conduct of the study, the ability to use resources and to discuss the obtained results with arguments.*<br>*3. Contribute international cooperation in the field of study, research and professional competence thus, promoting the increase of competitiveness of specialists.* |

| | |
|---|---|
| Results of the study programme | *Knowledges:*<br>*Apply the theoretical and practical knowledge in food production, quality management and innovation derived from basic and special science courses.*<br>*Able to explain the most important concepts and regularities of food science.*<br>*Able to demonstrate specialised knowledge and critical understanding of the importance of research in the development of new products.*<br>*Skills:*<br>*Able to use knowledge in food production processes to plan, model and choose the most appropriate solution for food production, quality management and innovation development.*<br>*Able to self-formulate, plan, structure, analyse, debate and demonstrate a scientific approach to the development of new products in collaboration with industry professionals.*<br>*Competencies:*<br>*Apply the acquired knowledge and skills in food production, quality management and the development of new products in a complex way.*<br>*Plan, organise and implement quality management and development of new products in the food production company, using critical thinking and teamwork.*<br>*Scientific research shall be capable of independently selecting and analysing scientific information and methods, describing the obtained information in analytical terms, using it in decision-making and problem solving in food production, quality management and innovation.* |
| Final examination upon the completion of the study programme | *Bachelor Thesis* |

# Study programme forms

**Full time studies - 4 years - latvian**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *4* |
| Duration in month | *0* |
| Language | *latvian* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Bachelor Degree of Engineering in Food and Beverages Technologies* |
| Qualification to be obtained (in english) | *-* |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

**Full time studies - 4 years - english**

| | |
|---|---|
| Study type and form | *Full time studies* |
| Duration in full years | *4* |
| Duration in month | *0* |
| Language | *english* |
| Amount (CP) | *160* |
| Admission requirements (in English) | *General secondary education or vocational secondary education. At least B2 level of English language skills* |
| Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english) | *Bachelor Degree of Engineering in Food and Beverages Technologies* |
| Qualification to be obtained (in english) | - |

**Places of implementation**

| Place name | City | Address |
|---|---|---|
| Latvia University of Life Sciences and Technologies | JELGAVA | LIELĀ IELA 2, JELGAVA, LV-3001 |

# III - DESCRIPTION OF THE STUDY PROGRAMME (1. Indicators Describing the Study Programme)

## 1.1. Description and analysis of changes in study programme parameters that have taken place since the issue of the previous accreditation certificate of study direction or the license of study programme if study programme is not included in the accreditation page of the study direction

The previous accreditation report states that the study programme has been revised and improved, however, it is necessary to pay more attention to practical skills, the use of e-learning and strengthen cooperation with manufacturers. While assessing the interest of students in the study programme "Food science", recommendations from employers, LLU strategy and general development tendencies in the European and world education area, in 2018 changes were made related to the study programme title and implementation language.

It is hard to imagine the economy of Latvia without knowledgeable specialists and scientists of the food and beverage industry, who invest their work and knowledge in the production of products of constant quality, development of new products, modernisation of technological processes, product quality control and its provision.

In the Development strategy of Latvia University of Life Sciences and Technologies (*Latvijas Lauksaimniecības universitāte* - LLU) for 2015-2022 *(approved on 9 December 2015 by the Senate of the LLU)* special attention is paid to those study programmes that prepare specialists for the promising bio-economy sectors included in the Smart Specialisation Strategy of Latvia. One of them is the food and beverage industry.

The study programme "Food science" was established and approved by decision No. 265 of the Senate of LLU on 10 March 1999, the content of which at the time of approval was based on the current findings in higher education and the food and beverage industry. Over time, the content of the programme has been adjusted according to the recommendations of accreditation experts. However, seeing progress in the engineering science and the food industry, in 2017 a need occurred for further improvement of the content of the programme. When beginning work on the improvement of the study programme, similar academic education study programmes in the European Union countries have been analysed, finding that the quality of food and/or innovations in food dominate in the titles of similar study programmes:

**Hochschule Fulda/University of Applied Sciences* offers the bachelor's study programme *"Engineering and Management: Food Innovation"*

https://www.hs-fulda.de/en/studies/departments/food-technology/studying/study-programmes/engineering-and-management-food-innovation/

**Dublin Institute of Technology* offers the bachelor's study programme *"Food Innovation"* https://www.tudublin.ie/study/undergraduate/courses/food-innovation-tu881/

**Van Hall Larenstein University of Applied Sciences* offers the bachelor's study programme "*Food Innovation Management"*

https://www.vhluniversity.com/study/programmes/bachelor/food-technology/specialisations/food-innovation-management

*Wageningen University offers the bachelor's study programme "Food Technology" https://www.wur.nl/en/Education-Programmes/Bachelor/bsc-programmes/bsc-food-technology.htm

It was possible to get acquainted and have discussions with the implementers of this programme within project No. 8.2.3.0/18/A/009 "Improvement of the management of LLU".

All these programmes are focused on managing the new product development process. The study programme includes interdisciplinary courses combining food technology with business management. As indicated in the descriptions of study programmes, it promotes the preparation of specialists, who are adequate to the production requirements and who understand the basic principles of production, sales, and business.

Industry experts, such as director of JSC "Rīgas Dzirnavnieks", quality manager of Ltd "Lāči", product development and quality manager of JSC "Hanzas maiznīca" and representative/expert of the Agricultural Organization Cooperation Council have been invited to improve the study program. The experts unanimously acknowledged that the Bachelor of Engineering studies must be implemented within 4 years and the content of food quality must be increased in the study programme. Large food companies in Latvia currently lack knowledgeable food quality specialists. The experts pointed out that the content planning of the programme with an aim to look at new product innovations through the prism of food quality is to be supported.

The research of Ltd "Dynamic University" on workforce demand trends within project No. 8.2.3.0/18/A/009 "Improvement of the management of Latvia University of Life Sciences and Technologies", points out that there is a stagnant level of employment in the field of food science and technology due to production automation and innovation-driven growth is needed - new products with high added value, packaging, marketing. Creating innovations requires highly qualified specialists, with the most demanded skills - technical, digital, and entrepreneurial; areas of knowledge - food hygiene and legislation.

This means that the young specialist must be able to successfully start a professional career in the Quality, New product development or Production departments of the food companies, but in small companies, to perform the functions of a quality specialist, including new product development and/or technologist. The experts supported the change of the name of the study programme from "Food Science" to "Food Quality and Innovations".

The improvement of the study programme is also focused on changes in the content, ensuring the implementation of studies that are based on knowledge and competencies. More extensive study courses have been developed for the study programme with the more versatile acquisition of knowledge and research orientation in a specific topic, maintaining the balance in the content part of the study programme between technologies, quality, and food innovations. In the 2nd and 3rd study year the study programme is implemented in the form of modules.

The activity of LLU in the international environment, identifying the interests and needs of foreign students, is topical for the Faculty of Food Technology (FFT). The teaching staff of the Faculty implements the master's study programme "Food Science" in English, also study courses for ERASMUS + students, BOVA activities and education of foreign students of the Faculty of Veterinary Medicine, actively participates in the implementation and preparation of international projects. It confirms the experience and knowledge of foreign languages of the teaching staff and general staff, and starting from the study year 2017/2018, the study programme has acquired the rights to teach in English.

### 1.2. Analysis and assessment of the statistical data on the students of the respective

**study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down in the different study forms, types, and languages.**

During the accreditation period (2013-2020), the demographic situation in Latvia is deteriorating, especially in the age group of 19-25 years old. During this time, the food sector stagnated with little growth. These are important factors that influence changes in the number of students in the programme

From the academic year 2013/2014 until 2014/2015 there was a decline in the number of students (see Annex), therefore, the first small changes to the content of the programme were initiated. The strategic development direction of the programme has been determined - a specialist for the development of new scientifically based products with opportunities to work in production, scientific research institutions and food chain supervision services. When improvement of the study programme began, the number of students stabilised slightly.

In the academic year 2017/2018 it was decided not to admit students, but to make significant changes to the content of the study programme, which are described in Article 1.1. Changes to the study programme were only approved on 6 June 2018 (Annex Atzinums_LLU_izmaiņas_SP_pārtikas zinības), therefore, it was not possible to expand an extensive marketing campaign of the study programme among young people and in academic year 2018/2019 8 applicants were admitted, while in academic year 2019/2020 the number of entrants increased. Interest in this programme was expressed by Samarkand Institute of Veterinary Medicine, with whom cooperation agreement No. 2.5. - 7/7 on the implementation of joint studies has been concluded on 4 March 2020, the studies are organised according to the 1 + 3 principle, respectively the first study year is implemented at the Samarkand Institute of Veterinary Medicine and the second, third, fourth study year - in the study programme of LLU “Food Quality and Innovations”, and in academic year 2020/2021 the first 14 students were admitted (paid studies).

One of the factors that ensures the level of study results is the results of matriculated students' grades in centralised examinations. When evaluating the results of the centralised examinations of matriculated students, it is observed that the number of applicants who have obtained the grade D or E (on average 20-40% acquisition level) decreases, but the proportion of applicants with the assessment of A, B, C (45-100% acquisition level) increases. It should be noted that the results of the centralised examinations also explain the changes in the number of students, who do not continue their studies due to non-fulfilment of the requirements of the study programme (up to 40-50%). (see Annex No. 5). From academic year 2013/2014 until 2015/2016, 40-50% of students did not continue their studies, which was more related to the content of the study programme. During the first semester, students understand whether they are interested in this field and whether they see their future in this profession. Students, who choose not to continue their studies in engineering study programmes, are up to 50% not only in Latvia, but also abroad. To maintain the number of matriculated students in the study programme, support mechanisms for new students are implemented: learning the basics of individual study courses (Basics of Physics, Basics of Mathematics), coordination of 1st year students - mentoring programme, changes in the type of tuition (modular system), individual consultations. After the implementation of these measures, the situation gradually stabilised and starting from academic year 2016/2017 the decrease in the number of students fell to 10%.

Changes in the study programme have contributed to the stabilisation of the number of students, however, it is necessary to follow the current events in the industry and to promote among

students and young people, the recognition of the programme and understanding of the profession and work specifics of the food quality manager, new product development technologist and food technologist as the production process manager. In close cooperation with food production companies, there is an opportunity to increase the interest in this study programme among young people and attract new students.

**1.3. Analysis and assessment of the interrelation between the name of the study programme, the degree or professional qualification to be acquired or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements.**

The title, the obtainable degree, goals, achievable results, and content of the academic education bachelor's study programme "Food Quality and Innovations" are closely related and in accordance with the interests of the industry and achieving the main goal of LLU activities. The degree obtainable in the study programme - Bachelor of Engineering in Food and Beverage Technologies complies with Cabinet of Ministers Regulation No. 49 / 2018.23.01. "Regulations on Latvian science industries and sub-industries". The aim of the programme is to prepare a competitive and knowledgeable specialist in the fields of food production, quality, and innovation, who is able to organise quality management and innovation development in food companies, perform creative research work and form the basis for further higher-level studies. The following tasks have been set to achieve the goal:

1. To provide and develop a competitive study environment and qualification of lecturers in order to implement a student-centred and competence-based approach to the acquisition of knowledge in areas of food production, quality management and innovation in higher education.
2. To ensure a modern research environment and to promote the involvement of students in the implementation of scientific research projects in order to develop skills to independently plan the course of research, the ability to use resources and to reasonably discuss the obtained results.
3. To promote international cooperation in the fields of studies, research, and professional development in order to facilitate the competitiveness of young specialists in the labour market.

The following results have been identified:

Knowledge:

Applies theoretical and practical knowledge acquired in the study courses of fundamental and special sciences in the fields of food production, quality management and innovations.

Is able to explain the most important concepts and regularities of food science.

Is able to demonstrate specialised knowledge and critical understanding of the importance of research in the development of novel foods.

Skills:

Is able to use the knowledge in food production processes to plan, model and select the most appropriate solution for food production, quality management and innovation development.

Is able to independently formulate, plan, structure, analyse, argue, and demonstrate a scientific approach to the development of novel foods in collaboration with industry experts.

Competencies:

To apply the acquired knowledge and skills in food production, quality management and development of novel food products.

To plan, organise and implement the quality management and novel product development in a food production company, by applying critical thinking and teamwork.

In scientific research work, is able to independently select and analyse scientific information and research methods, analytically describe the obtained information, use it in decision-making and problem solving in the fields of food production, quality management and innovation.

In order to achieve the set goal and results, great attention is already paid to the learning of related subjects (biology, chemistry, mathematics) upon the admission of students. Admission requirements when applying for studies are as follows: it is mandatory to have successfully passed the centralised examination (CE) in Latvian, mathematics, and a foreign language (English, German, French or Russian). The assessment of a foreign language may be replaced by the assessment of an international test (Regulation of the Cabinet of Ministers of the Republic of Latvia No. 543, 29.09.2015). CE in chemistry is also mandatory or a final mark in chemistry or science is evaluated. It is also possible to get extra points if the CE in biology has been successfully passed.

Considering the interconnection of the study programme parameters, it is possible to prepare a competent, competitive specialist for the food industry.

## III - DESCRIPTION OF THE STUDY PROGRAMME (2. The Content of Studies and Implementation Thereof)

**2.1. Assessment of the relevance of the content of the study course/ module and the compliance with the needs of the relevant industry and labour market and with the trends in science. Provide information on how and whether the content of the study course/ module is updated in line with the development trends of the relevant industry, labour market, and science. In case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation.**

During the accreditation period, changes were made to the study programme in relation to the map of related professions of the food and beverage industry developed within the framework of the European Social Fund project "Development of the Industry Qualification System and Increasing the Efficiency and Quality of Vocational Education" (agreement No. 2010/0274/1DP/1.2.1.1./10/IPIA/VIAA/001). At the highest level of professional qualification, there are two professions defined - food and beverage technologist (such specialists are trained by LLU) and food quality engineer (such specialists are not trained by any higher education institution in Latvia). Although this mapping is linked to the vocational training, it shows the need for high level food quality professionals in the food and beverage industry. While in recent years, as shown by the Dynamic University study on labour demand trends (carried out within the framework of project No.

8.2.3.0/18/A/009) and the recommendations developed, food science and technology have a stagnant employment rate due to production automation. Innovation-driven growth is needed - new products with high added value, packaging, marketing. Creating innovations requires highly qualified specialists, with the most demanded skills - technical, digital, and entrepreneurial and areas of knowledge - food hygiene and legislation. The content of most study courses is designed in accordance with these trends.

In the first three semesters, students take basic courses in the food industry, for example Hygiene requirements in the company, Quality systems, Basics of food science, Development of novel foods, Food microbiology, Sensory evaluation of food, etc. In the second and third semester, the development of course work is planned, in which the issues of food quality and research orientation are integrated. In the 4th, 5th and 6th semesters, study modules have been developed in which food technology issues are studied through a quality and innovation perspective. Feedback for students' understanding of technological processes of food products, new products are developed in the term paper, quality control points are determined and solutions for packaging, design and sales are being sought. In order to promote the work of students in a team, the course work is developed in groups (three students) and ideas are updated in accordance with the latest trends in the industry or the recommendations of manufacturers. In the 7th semester, study courses related to entrepreneurship and research are implemented: Entrepreneurship in the food industry, Project management, Quality assurance methods, Innovations in research, see the list in Annex No. 9 “Study plan”.

The content programme of the study courses is updated every semester, when starting the implementation of the course, according to the actualities of the industry and science, as well as the demand. The lecturer of the study course is responsible for updating the study courses, who follows the latest trends, improves his/her knowledge in research work, meets with production specialists and is able to educate new specialists in accordance with the market demand.

The proportion of study courses in the study programme “Food Quality and Innovations”, in which food quality and innovation issues are considered, is large enough to prepare new specialists in accordance with the demand of the industry.

**2.2. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators, the relation between the aims of the study course/ module and the aims and intended outcomes of the study programme. In case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels.**

The changes of the study programme “Food Quality and Innovations” last for three years. The study plan is comprised of three parts (see Annex No. 9 “Study plan”). Part A includes mandatory study courses, which are grouped in three parts and are acquired in the first, second and third year. The first group includes fundamental study courses that are adapted to the achievable results of the study programme, for example: Applied Mathematics, Physics in Food Industry, Inorganic and Analytical Chemistry, Organic Food Chemistry, Physical Colloidal Chemistry, Biochemistry. These study courses are implemented in the 1st, 2nd, and 3rd semesters and after mastering them students have the knowledge to successfully acquire and understand the study courses related to the field. The second group includes general and special industry study courses, which are

implemented in the 2nd and 3rd semesters. Fundamentals of Food Science I and II, Quality Systems, Novel Food Development, Nutrition Training, Food Additives, Food Microbiology, Food Production Equipment, Food Packaging, Food Sensory Evaluation, etc. - these study courses provide basic knowledge, skills, and competencies in the relevant field, which are essential in the further study process, mastering the course Processing of animal and plant raw materials. The third group study courses (in the 4th, 5th, and 6th semesters) are acquired in 5 modules - Fish processing technology, Milk processing technology, Fruit and vegetable processing technology, Grain processing technology, Beverage production technology. Each module covers technology, production and packaging equipment, quality assessment (sensory, physical-chemical, food safety) and management issues. The modules of the study courses also include cooperation with production companies, visiting and getting to know them, developing specific laboratory works and strengthening practical skills. To strengthen the theoretical knowledge, research and practical skills of the specialisation, students develop a term paper (Development of innovative products I, II and III), during which a prototype of a new product is created, and the most suitable technology or type of packaging for the new product is found. The development of these course works may be related to the interests of the production company, thus strengthening the cooperation. At the end of the studies (8th semester) students develop a bachelor's thesis (10 CP) on topics relevant in the industry or research. Often topics of bachelor's thesis are related to research projects implemented at the faculty or students' individual interests. The research begins in the 7th semester or earlier. In total, these study courses make up 123 CP and are decisive for the acquisition of knowledge, practical skills, and competencies of the new specialist, in accordance with the goals of the study programme and the results to be achieved. Part B of the study programme (Limited choice study courses) includes general study courses for expanding students' knowledge in accordance with the general guidelines of the state, industry and university - Business development (Entrepreneurship in the food industry, Food marketing, Economic activity analysis, Economic theory, Human resources management), research and quality development in the field of smart sciences (Project management, Quality assurance methods, Sociology, Innovations in research). The study programme is developed in the field of applied sciences, thus a great deal of attention is paid to the improvement of students' practical skills and understanding of the application of theoretical knowledge in practice. The study programme includes three internships in production companies and one internship in the development of research work at LLU or a scientific institution. Internships in production companies have been developed in accordance with the acquisition of theoretical study courses in the respective study year. After the first year, there is an internship “Introduction to the food industry”, in which students get acquainted with the general operating principles of a food production company, in the second year there is an internship “Quality in a food company”, in which students practice in the quality management department of a food company or in the food monitoring service, in the third year there is an internship “Innovation in a food company”, where students work in the R&D department of food companies or get acquainted with the process of developing new products. The research internship “Research work” is implemented at the Faculty of Food Technology or a scientific institution and is aimed at the development of scientific research work for a bachelor's thesis. In total, this part makes up 32 CP.

During the study process, students are offered free choice courses in the amount of 6 CP, which are included in Part C of the study programme. Every year free choice courses are updated according to the demand and the offer of lecturers. The previous accreditation report pointed to the limited possibility to acquire the study course or modules in other higher education institutions of Latvia.

Annex No. 8 “Mapping of study courses” shows the interrelation of study courses and the overall result of the study programme: opportunities for students to achieve knowledge, skills, and competences during four study years.

**2.3. Assessment of the study implementation methods (including the evaluation methods) by providing the analysis of how the study implementation methods (including the evaluation methods) used in the study courses/ modules are selected, what they are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

During the accreditation period, the study programme has been improved not only in terms of content, but also in the use of teaching methods, ensuring the implementation of knowledge and competence-based studies. Study courses are designed and consist of lectures, practical classes, laboratory works, seminars, internships, and study tours. The lectures are intended for the acquisition of theoretical courses, where the lecturers indicate the meaning and applicability of the topic, as well as the connection with other study courses. Practical, laboratory work or term paper is of great importance in the competence-based study process. In these classes, students, using transversal skills (critical thinking, problem solving, cooperation skills, ability to adapt), acquire competencies that are useful both in the study process in other courses, in practice and in professional development. Laboratory work is organised in two parts - at the beginning the student or student team performs the specified task, experiment, obtains results, analyses them, and draws conclusions. In the second part the obtained results are presented and discussed with the lecturer, using critical thinking. Students successfully use skills in analysing, data collection and analysis of results that are acquired in practical/laboratory work for carrying out research work both in term papers and by participating in scientific research and the development of bachelor's theses. During the study process there are also study tours to production companies with certain tasks. With each year, the study process increasingly uses the form of seminars, in which solutions to an industry-related problem situation are analysed, explained and the solutions are searched for in the form of discussions, using methods of pyramidal discussion, discussions, building a mind map, round table discussions, etc. At the end of the topic, the work in the seminar and the students' self-assessment of the acquired knowledge, skills and competences is the feedback in the process of student-centred teaching. A more detailed description of study courses is given in the appendix “Study course programmes”.

During this accreditation period, a lot of attention was paid to the acquisition and use of the e-learning platform in the study process. The workload of lecturers involved in the study programme in e-studies has increased by 75%. This included the development of materials, the development of tests, the conduct of online lectures, the provision of consultations and collaboration with students remotely. The pandemic situation in the world intensified this process and various additional tools were found to be used to ensure the study process, opening the possibility to partially learn the study courses remotely. However, when moving to a partially remote study process, it is necessary to further consider and choose other, different study methods that effectively work remotely. Additional simulation games, materials, video materials are needed to help visualise the study process. Despite the various future training opportunities, laboratory work must be provided in person in order to acquire and strengthen practical skills and achieve the goal of the study programme.

**2.4. If the study programme entails a traineeship, provide the analysis and assessment of the relation between the tasks of the traineeship included in the study programme and the learning outcomes of the study programme. Specify how the higher education**

**institution/ college supports the students within the study programme regarding the fulfilment of the tasks set for students during the traineeship.**

The study programme “Food Quality and Innovations” includes the acquisition of practical skills in a food industry company. During the studies, three production internships (“Introduction to the food industry”, “Quality in a food company”, “Innovations in a food company”) in food companies and research internship “Research work” are intended. Development of the research work is carried out in a research institute or the university. The implementation of internships is regulated by the LLU internship regulations (https://www.llu.lv/lv/studiju-prakses - *in Latvian*). Internships are provided at the end of each study year. The student chooses the internship place independently of his/her choice and notifies the internship supervisor at LLU. The programme of each internship is designed in accordance with the knowledge acquired by the students during the studies in order to strengthen the practical skills and competencies in the quality management and innovation management of a food production company during the internship. In each production and research internship there are certain tasks (see the appendix to the Programmes ENG), which the student carries out in the appropriate department of the company, LLU or scientific institute under the supervision of the company internship supervisor. The student prepares a report on the work done during the internship and presents it to the commission, which includes leading lecturers, the programme director, etc. If during the internship, students have shown interest in working at the company, have seen opportunities that can be addressed in the bachelor's thesis, successful cooperation is formed, and the student is provided with work after studies.

**2.5. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the evaluations of the final theses.**

According to the Law on Higher Education Institutions, the final thesis of the academic bachelor's programme is a bachelor's thesis. The development of the bachelor's thesis takes place in cooperation with the supervisor and/or scientific consultants and a representative from the production company. During the accreditation period, great attention is paid to the development of final theses on current topics and problems in the industry, as well as the relation to the implementation of scientific projects. The topics of the bachelor's thesis are related to the specialisation of the study programme:

Development of new products in the food industry: Quality of layered chocolate and honey cream; Development of oat milk chocolate; Obtaining and quality of pumpkin/quince distillate; Development of cereal flake salt porridge mixtures; Development of food supplement - energy bar with caffeine, L-theanine and ginkgo (Ginkgo biloba) extracts. Topics are related to the development of new products. Often these works are developed in collaboration with producers or because of the interest from students.

Technological solutions for quality assurance: Evaluation of chocolate bloom; Effect of salt concentration on the quality of dried beef; Sea buckthorn juice products and their quality; Influence of alcohol concentration and ultrasound on the quality of plant infusions.

Bachelor's theses developed within the framework of scientific research projects: Development of

extruded pea bars “Kraukšķis”; Development of whey beverage, Milky wheat grains as a prebiotic in the development of a functional dairy product, Development of camomile, calendula, mint, and yarrow tea beverages; Quality research of cream honey with mountain ash.

The defence of the Bachelor's thesis takes place at the meeting of the State Examination Commission (SEC). The commission consists of lecturers (40%), representatives of scientific institutes (20%) and production (40%). One month before the defence of the planned final work, the composition of the SEC is approved at the Council meeting of FFT. The leading production representatives are invited according to the specifics of the bachelor's thesis topics, therefore the composition of SEC is variable. The final works are reviewed, which is mostly done by the specialists from the food industry. The reviewer's evaluation is taken into account for the final evaluation of the bachelor's thesis.

The evaluation of final theses is 8.6 on average (in Table 2.5.1) and has fluctuated steadily from 8.0 to 9.0 during the accreditation period.

Table 2.5.1

Average evaluation of final theses

| | 2013/2014 | 2014/2015 | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 |
|---|---|---|---|---|---|---|---|
| Average evaluation | 8.2 | 8.6 | 8.6 | 9.0 | 8.6 | 8.5 | 8.7 |

The examination commission of the final theses acknowledges that the application and scientific level of the results of the bachelor's theses is growing and recommends continuing the topics of new product development and quality assurance.

## 2.6. Analysis and assessment of the outcomes of the surveys conducted among the students, graduates, and employers, and the use of these outcomes for the improvement of the content and quality of studies by providing the respective examples.

The evaluation of students is of great importance for the improvement of the study process, therefore a student survey is conducted every two years. The survey of students of the LLU academic education bachelor's study programme “Food Quality and Innovations” was conducted with the aim to find out the students' opinion about the chosen study programme, which would be the basis for taking measures to improve the study quality. Students are ready to make suggestions and recommendations, as well as provide both constructive and subjective criticism. Therefore, it was important to organise the student survey, explaining the shortcomings, possible improvements, and strengths in the implementation of the study programme “Food Quality and Innovations”. The main emphasis in the study survey is on four blocks of questions: study content and organisation; work of teaching staff and mutual communication; availability of teaching staff methodological materials, availability of lecture materials, provision of study premises, laboratories, their equipment; everyday life and activities outside studies. **Content and organisation of studies.** In general, the quality of the study process was assessed with 7, 8 and 9 points by more than 70% of the respondents; it means good, very good and excellent. The evaluation expressed by the students is very high, because despite the study courses included in the study programme: “Physics”, “Organic Chemistry”, “Physical-Colloidal Chemistry” and “Biochemistry”, students understand the role of these courses in the acquisition of knowledge, skills and competences

defined in the study programme and the promotion of logical thinking, but some topics are complex, difficult to understand and unrelated to industry study courses.

In order to find out the possibilities of acquiring practical skills, the question “Do you think the ratio of theoretical and practical work in the study programme is acceptable” was asked, where 76% acknowledged that the ratio is acceptable and well thought out, while 43% acknowledged that it would be necessary to increase it.

In order to find out students' thoughts about the study plan, as well as to find out possible changes in the future, students were asked a question: “After getting acquainted with the study plan, in your opinion, which study courses should be reviewed, and which should be supplemented? Which study course teaching quality would you recommend improving?” Students from different courses have given very different answers, indicating the study courses that cause them the most difficulties. Among them are “Meat, processing of it”, “Fish, processing of it”. Students recommend improving the quality of teaching these courses, the content of the study course, the availability of materials, the modernity of information and the style of teacher's work.

During the implementation of the study programme, it is planned to annually review and specify the study course programmes, including the tasks of internships and the possibilities of implementation. The production company chooses the internship supervisor for the students, but cooperation during the internship has to be established mutually, both from the students and the producers, which is not always successful. After the structural changes in the study programme, student surveys showed that the study process is orderly, easier to understand and a very positive assessment is given about the modular system, in which production, quality assurance and packaging courses are acquired in general.

**The work of the teaching staff and mutual communication.** At the end of each semester, LLU generally conducts a survey among students on the quality of the teaching staff and mutual communication, thus receiving feedback on the content of the study course and the way of teaching. Students answer six questions: At the beginning of the study course, the lecturer introduced the aim of its acquisition, the results to be achieved and their evaluation; The content of the study course was explained by the lecturer in an understandable way; The study course uses teaching methods/presenting style that facilitated the acquisition of the study course; The lecturer taught the study course with interest/enthusiasm, encouraging student participation; The lecturer provided feedback (explanation, analysis) on the results of the learning/test work; The lecturer was available for consultations. Every year, students are encouraged to fill in questionnaires and indicate gaps, thus creating an opportunity to participate in the development of the study course. In the last three study years, the questionnaires are filled in by an average of 80% of students and the average evaluation of the study programme is in the range from 4.5 to 4.6, which is really high. As positive events, students noted the interesting practical work, work in groups, cooperation between teachers and students, while improving the lecture materials was recommended, adherence to the work plan, reflect on the amount of reference material and the adequacy of time.

**Availability of teaching staff methodological materials, availability of lecture materials, provision of study rooms, laboratories, their equipment;** At the beginning of the accreditation period, the survey of the 2013/2014 academic year showed that students' opinions were divided on issues regarding material and technical provision. Almost 60% stressed that the provision was sufficient. However, 40% of the students in the study programme indicated that it is insufficient, and it depends on the specific laboratory. Similar results were obtained in the following years. However, starting with the 2015/2016 academic year, when the Faculty of Food Technology acquired the new premises and improved the material and technical provision of the study process, more than 76% of students indicated that it is sufficient, appropriate, and modern. However, there

were answers from ~ 17% that it is insufficient and outdated, as well as one questionnaire indicated that the meat and fish laboratory does not meet modern requirements.

The material base of the faculty laboratories has been modernised, in 2014 the funds from the LLU implemented ERDF project “Modernisation of Higher Education Institutions' Premises and Equipment for Improving the Quality of Study Programmes, Including Ensuring Opportunities for Persons with Functional Disabilities” has been acquired in the amount of more than LVL 200,000 for the purchase of teaching and research equipment. In 2015, a new FFT Study and Research Centre was built with a modernised study environment, where it is possible to put more emphasis on the acquisition of practical skills in food production and equipment operation. These changes have been evaluated by students and they acknowledge that the study environment is in line with modern requirements and easy to use. Every year the study work in the e-environment increases, which is appreciated by the students: facilitates the study process, because the materials are easily accessible, easier communication with the lecturer and submission of works. The survey of the 2019/2020 academic year shows that it is easy for students to acquire the theoretical basis using the distance learning process, however, the practical skills that are acquired in laboratory work need to be implemented in person in laboratories. Students acknowledge that the competence of teachers to work in the e-environment is of great importance for the use of e-studies and the availability of materials.

**Life and activities outside studies.** During the survey, it was found out that everyday life and activities outside the studies create a positive atmosphere in the faculty and the desire to study.

For the qualitative implementation of the study process, the opinion of the graduates about the provision of the study process, the acquired knowledge, skills, and competencies in studies is of great importance.

Graduates were asked to evaluate the study process in a 10-point system. 60% of graduates have evaluated the study process with 8 to 10 points. We believe that the evaluation of graduates about the study process at the faculty is high. And despite a certain nostalgia and nice moments during the studies, the evaluation of graduates is more objective than the evaluation of students.

Almost 82% of graduates have noted that teachers are professional and qualified.

Graduates were asked, which knowledge they lack most in their professional field today from the ones the faculty could provide. In fact, the thoughts of the graduates somewhat resonate with the students' opinion about the study courses that should be improved.

Therefore, the next question asked to them was, which courses would the graduates recommend improving? Here the thoughts of the graduates differed radically; some believed that the teaching of the courses is good, the main thing is that the student is motivated and interested in learning the appropriate course. A large number of graduates indicated that “Meat Processing”, “Grain Processing” and “Fish Processing”, “Economic Theory”, “Ecology and Environmental Protection”, “Quality Management” are the courses, the teaching quality of which needs to be improved. Comparing the answers of the graduates with the evaluation of the students, when asking similar questions, there are no significant differences in the answers. In their answers, the graduates indicate that there are no basic objections to the study course, they want to see the teaching of the course corresponding to today's conditions and the interest of students.

Graduates were asked the following questions, namely, how do they assess their knowledge in the courses related to the profession (in points from 1 to 10) and how do they assess the compliance of the study process with the qualification to be awarded? Graduates assessed their knowledge in very different ways in the special courses, which are on a scale of 6 to 9, i.e., from almost good to very good. 40% of graduates consider their knowledge to be very good. Graduates also believe that

there are too few special courses and too many general education courses in the study plan. It should be noted that graduates associate mathematics, chemistry, and physics with general education courses and not with theoretical courses of the industry.

In general, graduates evaluate their knowledge as high and sufficient; it is expressed by 60% of the respondents. This means that graduates are generally satisfied with what they have learnt.

Graduates were also asked what they most lacked when starting their careers. They replied foreign language knowledge and practical experience, confidence in the knowledge of special courses, courage, communication, and personnel management skills. We wanted to find out, if there are any real problems with finding a job in the speciality. Almost 55% of respondents answered that there are no problems.

Knowing that graduates start their practical work after graduation and only a part of them continue master studies, we wanted to know how a graduate could acquire and deepen his/her knowledge in the profession. In answering this question, the thoughts of the graduates were divided; 40% of them noted that knowledge can be acquired by studying for a master's degree and 40% noted this in seminars and courses.

Graduates were asked if they would study in this study programme again if there were such an opportunity. Almost 65% of the respondents answered that they would be ready to study again. In fact, this is also an explanation that we have always been proud of, **a very high proportion of graduates work in the food industry and graduates have always been loyal to their Alma Mater and FFT patriots.**

Analysis of the employer survey. When surveying the managers of Latvia's leading food companies about the knowledge, skills, and competencies of the graduates, they acknowledge that the graduates are well prepared for the performance of analyses, in the sensory evaluation of food products, young people have skills to work with laboratory equipment, excellent theoretical knowledge in microbiology, biotechnology, milk processing. Employers point out that graduates are well prepared in theory, but they do not have practical work experience. It should be noted that the amount of internships in this study programme is not limited at all; the faculty has tried to provide production internships in the amount of 9 CP.

Employers were asked how they see the future prospects of the faculty. Employers emphasised the need to join forces in the training of new specialists - practical experience on the part of the company - education in the responsibility of LLU. Employers have also expressed a desire to work more closely together on research projects.

In order to evaluate the content and quality of implementation of the study programme “Production and Processing” implemented by FFT, in the summer of 2017 a survey of specialists of leading food companies was conducted. They positively assessed the content of studies and pointed to the improvements to be made, to develop the skills of young specialists to work in a team. Improving the content of the academic study programme, a significant emphasis is placed on the development of communication skills, envisaging the development of term papers in a team/group.

**2.7. Provide the assessment of the options of the incoming and outgoing mobility of the students, the dynamics of the number of the used opportunities, and the recognition of the study courses acquired during the mobility.**

The LLU Centre for International Cooperation administers the LLU Study Mobility in relation to the Erasmus+ programme core activity No. 1 Learning mobility in the higher education (KA1). Study mobility allows LLU students to go to an Erasmus + partner/programme country to study their chosen field in depth and to gain new academic, professional and life experience. Students can implement the study process for 12 months in one of the partner universities. The study programme “Food Quality and Innovations” has concluded agreements with 27 universities in 11 European countries.

Each year, students choose to study or develop practical skills outside the university (Table 2.7.1.).

Table 2.7.1.

Number of students outgoing the Erasmus + programme

| | 2013./2014. | 2014./2015. | 2015./2016. | 2016./2017. | 2017./2018. | 2018./2019. | 2019./2020. |
|---|---|---|---|---|---|---|---|
| Study mobility | 0 | 3 | 1 | 2 | 5 | 4 | 2 |
| Training mobility | 2 | 2 | 1 | 2 | 0 | 1 | 0 |
| Total | 2 | 5 | 2 | 4 | 5 | 5 | 2 |

Each year, two to four students choose to spend one semester at a partner university, as well as 1-2 students to spend internship in one of the food production companies. Overall, this shows a growing trend to take advantage of these opportunities. For mobility, students choose higher education institutions, whose study courses correspond to the study courses of the corresponding semester of the study programme “Food Quality and Innovations”. During the mobility, students acquire study courses in the amount of 30 ECTS/20 CP, which corresponds to the average amount of one semester. Upon return, the acquired study courses are equated in accordance with the academic recognition process.

During the accreditation period, students from partner universities have also studied in the Erasmus + study program.  On average, we enroll 2-3 students every year (Table 2.7.2.). In the academic year 2017/2018 when making changes to the study programme, interest continues from foreign students and gradually in academic year 2018/2019 and 2019/2020 the first students from the partner universities of Valencia Polytechnic University, the University of Ljubljana and the Lithuanian University of Health Sciences came within the mobility.

Table 2.7.2.

Number of students entering the Erasmus + programme

| 2013./2014. | 2014./2015. | 2015./2016. | 2016./2017. | 2017./2018. | 2018./2019. | 2019./2020. |
|---|---|---|---|---|---|---|
| - | 3 | 2 | 7 | 1 | 1 | 3 |

Currently, taking the growing tendency to study remotely into account, it is planned to offer study courses remotely in the future. Of course, this is convenient for students, because you can study in your own country, but it does not provide one of the goals of the programme - to get to know the traditions of the country and gain new life experience.

## III - DESCRIPTION OF THE STUDY PROGRAMME (3. Resources and

## Provision of the Study Programme)

**3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples. Whilst carrying out the assessment, it is possible to refer to the information provided for in the criteria set forth in Part II, Chapter 3, sub-paragraphs 3.1 to 3.3.**

The implementation of the study programme and the achievement of study results is ensured by the sufficient support of administrative, study and technical staff. The implementation of the study programme is organised by the director of the study programme, the methodological commission of the faculty and the dean. The methodological, informative, and material-technical provision of the study programme (incl. equipment of premises, study environment, financing for students' self-government) at LLU and FFT is sufficient and is able to ensure an efficient study process.

Students have the opportunity to use their material and technical base, information, including e-environment (internet, databases, e-studies on the Moodle platform) and financial support (student scholarships) to study independently.

Students with successful grades can receive a state scholarship through a competition. Every semester, the LLU Development Foundation announces several scholarships, for which successful and active students have the possibility to apply. Students of the study programme “Food Quality and Innovations” have received JSC “Rīgas Dzirnavnieks”, K. Ulmanis and J. Čakste, as well as other scholarships.

In the previous accreditation period, the need for the more active use of e-learning in the study process was indicated. In recent years, e-learning has been the main tool in the organisation of the study process and the intensity of its use during the remote study process has increased. Study materials are placed in e-studies created by LLU in the Moodle environment, which is available on the website: http://estudijas.llu.lv/

Students and visiting professors have the opportunity to use service hotels and other services (internet, electronic databases, library, etc.) during studies or work.

In the Fundamental Library of LLU (https://llufb.llu.lv/en), it is possible to access information resources in different languages so that students can successfully implement their studies and obtain the necessary information for the development of scientific works. The Electronic Catalogue of the Fundamental Library of LLU contains information on more than 3,500 publications in the field of food science. From 1 June 2012, the LLU Fundamental Library provides access to subscribed databases outside the LLU network with the EZproxy tool, using the LLU IS or E-study user account.

There are various options for searching for information:

- **Databases:**
  - AGRIS database;
  - “Electronic catalogue of the LLU Fundamental Library”, “Publications of LLU lecturers and researchers”, “Doctoral theses defended in LLU”, “Master's theses in LLU” and “Articles of LLU journals and conferences”;

    - Subscribed databases, E-journals, E-books: CAB Abstracts, CABI Animal Health and Production Compendium, CABI Crop Protection Compendium, CABI Forestry Compendium, CRC Press e-books, EBSCO database, EBSCO eBook Academic Collection, Newspaper Library, Letonika, ScienceDirect journals, Scopus, Escival, Web of Science, Wiley Online.
- **Library collection** *(in agriculture - 38%, in natural sciences - 10%, in social sciences - 24%, in technology - 19%, in other fields of science - 9%)***;**
- **Internet resources** *(encyclopaedia, dictionaries, etc.)***;**
- **Information searchers and portals** *(CiteseerX Scientific Literature Digital Library and Search Engine, Elsevier, Springer LINK, etc.)***;**
- **Work with scientific publications:**
    - Bibliographic references;
    - ORCID;
    - Publons;
    - Mendeley;
    - Books on writing publications.

In 2015 the Study and Science Centre of the Faculty of Food Technology of LLU in Valdeka (Rīgas iela 22a, Jelgava) was put into operation. Thanks to ERDF projects, the study and scientific base has been modernised:

1) No. 2010/0119/3DP/3.1.2.1.1./09/IPIA/VIAA/009 “Modernisation of LLU study infrastructure”;

2) No. 2011/0040/2DP/2.1.1.3.1/11/IPIA/VIAA/002 “Research Centre of National Importance for the Utilisation of Agricultural Resources and Food” (2012-2015).

The invested funding in the development of the faculty and infrastructure is an essential condition for the implementation of the study process. The study process is carried out in the premises of FFT (Rīgas iela 22a), but the implementation of separate study courses also takes place in other LLU buildings - the Faculty of Economics and Social Development (Svētes iela 18) and the LLU main building - the castle (Lielā iela 1). All auditoriums have an internet connection, equipment available for lecturing - a multimedia projector, a computer, etc. The following laboratories with various scientific equipment are at the disposal of the faculty for the training of students and development of scientific works:

- sensor evaluation laboratory (10 individual workplaces equipped with FIZZ portable (BIOSYSTEMES, France) system, which is an interactive system for performing sensor tests and collecting and interpreting the obtained data);
- biotechnology laboratory (gastrointestinal simulation device);
- scientific microbiology laboratory (colony counter, incubators, microscope with video camera and equipment, microscopes, microtome for light microscopy, microbiological analysis of water and beverages, refractometers);
- food quality laboratory (Kriostar for determining the freezing temperature of milk, distillation equipment, viscograph for determining the viscosity of flour, farinograph, distillation equipment for determining alcoholic strength, volatile acids);
- nutrition laboratory (flow injection equipment (for the determination of nitrites and nitrates in milk, meat products), hydrolysis equipment, filtration equipment for fibre determination, fluorometer, extraction equipment set Soxtec 2045, distillation equipment set Kjeltec 2100, mineralisation equipment with collector);
- packaging laboratory (equipment for packaging products in a gas environment and vacuum, gas composition analyser, equipment for the determination of pressure and tensile, gas mixer, portable colour spectrometer, juice filler, autoclave (back pressure), vertical packaging

equipment with a dispenser);

- pilot plants (for fruit and vegetable processing, grain processing, milk processing, meat and fish processing, bakery) (combi oven, meat mincer, cutter, shelf digital product smokehouse, filling machine, pilot plant for liquid food concentration, freezer, cheese bath, homogeniser, multifunctional tank, threshing barrel, oven (shelf type) with fermentation, rotary bread oven with fermentation, single-screw and twin-screw extruders, dough mixers, brewing machine, juicer, oil press, termination equipment, climate chamber);
- process and equipment laboratory (high-pressure equipment, sublimation vacuum dryer, plate quick-freezing equipment, microwave vacuum dryer, equipment for microencapsulation of biologically active substances in laboratory conditions, plate and tube heat exchangers, film-type evaporator equipment);
- scientific laboratory (Heed Space system Turbo Matrix16, drying cabinets, hydrogen generator, gas chromatograph Clarus 500 with accessories, gas chromatograph with mass selective and opacifying detector, equipment for measuring the consistency of viscous liquids, solid-phase extraction equipment, centrifuge, spectrometer, automatic sample injection system, ultrasonic bath, viscometer, structure analyser, water activity meter, mass spectrometer, colour analyser, UVNis spectrophotometer).

The sources of financing of the study programme “Food Quality and Innovations” are to be received in accordance with the procedures specified by LLU:

- LR state budget funds intended for the implementation of the study programme by financing a certain number of study places;
- funds paid by natural persons for studies;
- funds from the development of scientific contract works (part of these funds is allocated for the renewal of material and technical base, purchase of equipment and apparatus, purchase of chemicals and other
- laboratory utensils, computer equipment, presentation equipment: multimedia, etc.);
- the purchase of consumables for performing specific analyses;
- funding for the maintenance of scientific infrastructure;
- ERDF financing for the repair of laboratory premises, materials for the improvement of the technical base.

The amount of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MoES), the Ministry of Agriculture (MoA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite agreement on funding **for 2020** stipulates that the basic cost of one study place is EUR 1518.98, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme “Food Quality and innovations” is 1.8 (coefficients for each thematic area of education are different, they are stipulated in Cabinet Regulation No. 994 “Procedures for financing higher education institutions and colleges from the state budget”), costs per student in the bachelor's programme “Food Quality and Innovations” are EUR 2898.03 .

Every year, the LLU Senate approves the distribution of revenues and expenses of the LLU general budget structure, prepared in accordance with the Saeima annual law “On the State Budget” and the annual LLU Rector's order “On LLU general budget planning”. The control and audit of the general budget is performed by an independent sworn auditor, whose opinion and report are reviewed and approved by the Senate of LLU.

Before approving the distribution of LLU general budget revenue and expenses in the Senate, it is reviewed, discussed, and approved by the Working group on resource use and development, which

consists of the Rector, vice-rectors, chancellor, LLU director, deans of faculties, head of resource accounting centre/chief accountant, head of the financial planning centre, key economists, key specialists in real estate and legal issues.

The distribution of income and expenses approved by the LLU Senate determines that 80% of the funding allocated from the state consists of compensation costs and 20% of other costs. 60% of the paid study funding consists of reimbursement costs and 40% other costs, of which 20% are directly at the disposal of the faculty that implements the respective study programme. The amount of funding for the science base is calculated and allocated annually from active research activities. The science base funding in the amount of 50% is at the direct disposal of the faculty and 50% to cover centralised costs. The science funding consists of funding attracted for the implementation of projects.

The tuition fee for the bachelor's study programme “Food Quality and Innovations” for Latvian residents is EUR 1900 per year, while for non-Latvian residents it is EUR 3000 per year.

The overall distribution of the total LLU budget is formed by the estimates of structural units/faculties, where the costs are estimated by type of expenditure.

2020. The share of costs of the bachelor's study programme “Food Quality and Innovations” consists of:

- Remuneration - 74%
- Scholarships - 8%
- Goods and services - 17% incl. utilities - 6%
- Formation of share capital - 1%

**For comparison, public funding by year**

The tripartite agreement from **2019** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1518.98, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme ”Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2897.84.

The tripartite agreement from **2018** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1458.51, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme “Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2788.54.

The tripartite agreement from **2017** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1393.33, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme “Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2672.14.

The tripartite agreement from **2016** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme ”Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2190.94.

The tripartite agreement from **2015** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for bachelor's programmes

is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme ”Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2191.06.

The tripartite agreement from **2014** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1333.11, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme “Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2173.52.

The tripartite agreement from **2013** on state funding for the study programmes stipulates that the basic cost of one study place is EUR 1333.36, the study level coefficient for bachelor's programmes is 1 and the social security of the study place for bachelor's programmes is EUR 164.34, the education thematic area study cost coefficient for the bachelor's programme “Food Science” is 1.8, the cost per student in the bachelor’s programme “Food Science” is EUR 2181.55.

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

## III - DESCRIPTION OF THE STUDY PROGRAMME (4. Teaching Staff)

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

An average of 41 lecturers are involved in the implementation of the study programme in Latvian and English, which is constantly in the accreditation stage. Not less than 5 professors and associate professors elected to academic positions at LLU participate in the implementation of the compulsory and limited free choice parts of the study programme. It should be mentioned that the level of language skills of the lecturers involved in the implementation of the programme in English is not lower than B2. The majority (34%) are lecturers, while professors provide 19% and associate professors 17% of the study process. 29% of the teaching staff are involved in the implementation of the study programme. In the study process, the renewal and growth of lecturers is constantly taking place, which is also evidenced by the proportional distribution between positions. 72% of elected employees participate in the implementation of the study programme, which shows stability in attracting the teaching staff.

**4.2. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants) involved in the implementation of the study programme with the conditions for the implementation of the study programme and**

**the provisions set out in the respective regulatory enactments. Provide information on how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.**

In the implementation of the study program 38 lecturers are involved, 33 of them are elected employees of the university, additional information is summarized in the appendix "List of teaching staff". The qualification level of the teaching staff involved in the study programme is confirmed by diplomas of higher education and scientific degree, as well as a pedagogical qualification document. Currently, 95% of the lecturers involved in the study programme have a doctoral degree in a relevant field. This indicates the implementation of a high-level study process. Each lecturer, who is involved in the study process, once in six years acquires the professional development programme for university and college teachers “Innovations in the didactics of the university” in the amount of 4 CP.

Every year the lecturers improve and supplement their theoretical, practical and research knowledge in various courses. During the accreditation period, great attention was paid to improving English language skills. Most of the teaching staff involved in the study process additionally learnt English and in the 2019/2020 academic year, as well as in the 2020/2021 academic year, took the Pearson test at the appropriate level of learning. Great attention is also paid to professional growth in accordance with the specialty, for example, attending courses organised by the industry, seminars on the latest trends, the use of raw materials, the choice of packaging materials, etc. In 2018, lecturers improved their knowledge about bread technological processes at the seminar “Hands-on Training on Baking Technology” in Vienna. Leading lecturer of sensory evaluation study courses acquired and supplemented the sensory evaluation programme “Fizz Network” in 2019 by the courses “Preferences expectations understanding contexts emotions consumers individual differences product characterisation” organised by the Italian Sensory Sciences Society (ISSS) in Florence, Italy, and FIZZ Network sensory software: Master the essential concepts of FIZZ sessions.

Leading lecturers of milk processing have participated in the courses “News in ice cream and milk processing”, which were organised by AS NEO together with AarhusKarlshamn AB, Nimbus Foods and Chr.Hansen, in Riga. “Demand, assortment and production trends for household products and niche products in the European Union” in France. The lecturer of technological equipment participated in the seminar “Rheology Day” organised by SIA Armgate in cooperation with Anton Paar (Austria) and in the seminar “Paradigms of Food Engineering for Positive Health Functionality and Impact” organised by the World Food Science and Technology Association (IUFoST). ZRKC courses “Design Thinking for Entrepreneurs” were acquired by the director of the study programme.

In the 2019/2020 academic year within project No. 8.2.2.0/18/A/014 “Improvement of the LLU academic staff” the lecturers of the study programme have implemented professional development by attending courses related to information technologies, by also doing internships in food industry companies (200 h).

Every year, teaching staff and technical staff update their professional knowledge and skills within Erasmus+. Within the framework of mobility, the study and research process, the technical support of the study process are introduced, as well as the latest trends in the organisation of the study process and the possibilities of further cooperation are discussed in the discussions. On average, 10-12 FFT lecturers use these opportunities during the study year.

**4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of the doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals may be additionally specified (if applicable).**

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

**4.5. Provide examples of the involvement of the academic staff in the scientific research and/or artistic creation activities both at national and at international level (in the fields related to the content of the study programme), as well as the use of the obtained information in the study process.**

The academic staff of the study programme is actively involved in scientific research work both as project managers, as scientific managers, and as leading researchers or researchers. Practising in research improves knowledge, accumulates experience, and promotes recognition at the international level. Activity in scientific projects gives the opportunity to also involve more students in the scientific research work, that interests them to focus on the master's studies and future scientific research work. During the accreditation period, the lecturers involved in the study programme have participated in more than 35 scientific research projects on new food product development solutions, as well as knowledge transfer in quality management, and food safety issues. These issues are also considered at the national level by participating in the implementation of State research programmes, in the implementation of ERAF, ESF LAD projects, as well as LLU grants.

There are a total of 7 international level projects in different thematic areas. The development of new scientifically based protein-rich products from legumes has been implemented FP7-KBBE-2013-7 “Enhancing of legume growing in Europe through sustainable cropping for protein supply for food and feed (EUROLEGUME)”. In order to promote students' participation in scientific research work, students were also involved in the implementation of the project. Providing research space, a bachelor's thesis “Development of extruded pea bars “Kraukšķis”” has been developed within the project. While “Development of biologically activated flakes and breakfast cereals from hulled oats, hulled barley and triticale development” was implemented within the framework of NFI/R/2014/11 (Norway Grant) Innovative approach to hull-less spring cereals and triticale use from human health perspective. Within the international project EEZ Norway grants “NFI/R/2014/11 “Innovative approach to hull–less spring cereals and triticale use from human health perspective”

the germination possibilities, quality changes and application possibilities of oat and hulled oats, as well as barley and hulled barley and triticale in the development of breakfast cereals were researched. In collaboration with scientists from Norway and Latvia (LLU, Institute of Agricultural Resources and Economics and RSU).

These projects include comprehensive research on both the quality of new products and food safety issues, thus covering the topics included in the study programme and the transfer of knowledge from science to the study process. The lecturers use the acquired knowledge in the study courses “Grains and their processing”, “Food packaging”, “Food microbiology”.

Activity in COST Action CA18101 SOURDOMIC “Sourdough biotechnology network towards novel, healthier and sustainable food and Bioprocesses”, new opportunities for cooperation are opening up in this area. During project implementation, LLU grants have been obtained (“Carrying out fundamental research in LLU” scientific project G3 “Research of biologically activated barley and hulled barley fermentation process, development of yeast with increased exopolysaccharide content” and LLU Scientific capacity building “Biotechnological solutions for barley yeast development with reduce gluten levels”) research on oat, barley, hulled barley and also sprouted barley flour, looking for new solutions for the evaluation of the development of spontaneous yeast microflora and the production of biological compounds. Use of the flour of the above cereals and *Lactobacillus spp*. and *Pediococcus pentosaceus* is a good solution for the development of a long-term controlled fermentation process and microflora with the aim of increasing the proportion of exopolysaccharides and reducing the amount of gluten in yeast and further in bakery products. The experience gained in this project on the evaluation of yeast quality is used in the implementation of the study course “Grains and their processing” to develop yeasts and analyse their microflora together with students during laboratory work.

Research on consumer understanding in Latvia, Europe and the world has been conducted within the framework of international projects:

CI&DETS Research Centre, Polytechnic Institute of Viseu, Portugal R&D Project “Study about the knowledge and habits regarding food fibres in different countries, No. PROJ/CI&DETS/2014/0001, and CI&DETS Research Centre, Polytechnic Institute of Viseu, Portugal R&D Project “Psycho-social motivations associated with food choices and eating practices”, No. PROJ/CI&DETS/2016/0008. Taking the previous scientific evidence on the role of fibre in nutrition and health promotion into account, the aim of this project study was to develop and validate a tool to assess the population's knowledge of fibre-rich products. During the study, more than 6,000 people from 10 countries of the world, including Latvia, were interviewed. As a result of the research, the knowledge of European and world consumers about the role of dietary fibre in the diet and psycho-social motivation in food choice was clarified. The lecturers involved in the project use the acquired knowledge and results in the study process to explain the importance of fibre and whole grain products in nutrition and product development.

During the accreditation period, the teaching staff is involved in a total of more than 30 projects of a national level.

State research programme “Agricultural resources for sustainable production of quality and healthy food in Latvia (AgroBioRes) (2014-2017) and National research programme, theme VP42- “Economic, political and legal framework for preserving the potential of the Latvian economy and promoting the growth of competitiveness after the crisis caused by the pandemic (reCOVery-LV)” No. VPP-COVID-2020/1-0010” 01.07.2020-31.12.2020, conducting research on timely topics in the food sector, but also providing insights into economic development. During the project, a student of the study programme was involved and a bachelor's thesis “Milky wheat grains as a prebiotic in the development of a functional dairy product” was defended.

Scientific research projects, which are implemented in cooperation with food production representatives, play an important role. As a result of the projects, a product is in demand on the market; it should be noted that in recent years the number of such projects has been increasing, thus promoting cooperation between industry and science. In this case, teaching staff and students acquire invaluable knowledge and in-depth competence in technology transfer from a scientific laboratory to production. The development of food products based on current topics in the industry has been important throughout the accreditation period, thus several EAFRD projects have been implemented: No. ZM /2012/22_EAFRD “Increasing the added value of food produced from Latvian agricultural products and promoting the competitiveness of food products” (2012 to 2014); No. 19-00-A01612-000009 “Development of scientifically based sour milk products from raw materials obtained from organic farming and their clinical research”; No. 18-00-A01612-000012 “New solutions for the production of dairy products and their by-products”, No. 19-00-A01612-000007 “Economically justified processing of whey for new products for food and feed”. Students also worked on the development of these projects and a bachelor's thesis “Development of Whey Drinks” was developed.

European Maritime and Fisheries Fund project “Production of structured fish mass (minced meat) from Baltic Sea fish and its use in fish products”, No. 16-00-F01101-000005 (2017-2018), theme EMFF1; European Maritime and Fisheries Fund project “Preserves (salty products) “Baltic anchovies in oil” and paste “Baltic anchovies” technologies and development of recipes from Baltic sprats (Spratus balticus) as an analogue of the traditional Italian preserves “Anchovies in oil” and their production process mechanisation”, Project No. 17-00-F01101-000003, theme EMFF. The knowledge and practical skills gained in the project are successfully integrated into the study course “Fish processing” European Agricultural Fund for Rural Development Project No. 18-00-A01612-000006 “Development of innovative medicinal foods for malnutrition/dysphagia patients, creating a new, nationally important product with high added value” (2018–2021). Projects related to food quality and safety MoA project No. S298 “Impact of compliance with the principles of good production practice on the reduction of polycyclic aromatic hydrocarbon (PAH) levels in traditionally smoked meat and meat products” (2015-2016), as well as ESF project No. KAP/2.3.2.3.0/12/01/004 “Food product quality cluster” (2013-2015).

The involvement of the teaching staff in scientific research work is an essential component in the implementation of the study programme in order to achieve the set goal of the programme. In the future, the involvement of lecturers in the implementation of international projects and the involvement of the best students in the development of research at this level should definitely be promoted in order to ensure knowledge transfer and to interest students in choosing higher level studies in “Food Science”.

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

The implementation of the study programme is a branched mechanism of several horizontal and vertical levels, in which the mutual cooperation and interest of the teaching staff is of great importance. By promoting mutual cooperation and a sense of community that goes beyond loyalty to one's own unit, it is possible to promote new initiatives, new projects, and a much broader sense

of belonging, so it is very important to develop both horizontal and vertical interactions between those involved in the programme. These principles were taken into account when improving the study programme implementation approach. Initially, joint meetings were held to clarify the topics of the study course according to the industry, thus making the general study courses more understandable and useful for the industry, for example, Physics in the food industry or Applied Mathematics. By mutually developing the course topics, for example, the involvement of lecturers in the development of the programme and its further implementation was facilitated, as it created a sense of responsibility and belonging. Continuing the improvement of the programme, courses and lecturers, study courses were developed, involving lecturers from different departments, for example, term paper Basics of Food Science (lecturers of the Department of Food Technology and Department of Chemistry) or Nutrition Physiology (lecturers of the Department of Nutrition and Department of Chemistry). In turn, 4-6 lecturers from different departments work together in the study modules of animal or vegetable raw material processing, the amount of which is 6 CP/9 ECTA, 7 CP/10.5 ECTS or 8 CP/12 ECTA. As a result of cooperation, the topics of the term papers are coordinated and expanded in depth, as well as methods are used that ensure the acquisition and strengthening of new knowledge and skills, adopting good experience and practice, mutual learning, thus ensuring a student-centred learning process. Leading specialists are involved in the development of the final thesis, while the bachelor's thesis supervisor consults and coordinates the course of the research.

The teaching staff involved in the study course participates in the defence of test works and term papers, creating a comprehensive assessment of students' knowledge, skills, and competencies. The number of lecturers against the number of students in the study programme is a relatively high 10.6 students per lecturer. On average, the university has 13.3 students per lecturer; it also has its own negative features. Working with small groups of students increases the number of contact hours for a lecturer to ensure a full-time workload. Thus, reducing the possibility to work in the field of science and research. However, in this case, the students benefit because the student groups are smaller, there is more of an individual approach, it is more possible to pay attention to the students' individual problems, which are assessed and emphasised by the students of the programme.

# Annexes

| | | |
|---|---|---|
| III. Description of the Study Programme - 1. Indicators Describing the Study Programme | | |
| Compliance of the joint study programme with the provisions of the Law on Institutions of Higher Education (table) | | |
| Statistics on the students over the reporting period | Annex No5.docx | Pielikuma nr5.docx |
| III. Description of the Study Programme - 2. The Content of Studies and Implementation Thereof | | |
| Compliance of the study programme with the State Education Standard | Annex No6.docx | Pielikuma nr6.docx |
| Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable) | | |
| Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable) | | |
| Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme | Annex No8.xlsx | Pielikums nr8.xlsx |
| Curriculum of the study programme (for each type and form of the implementation of the study programme) | Annex No9.docx | Pielikums nr9.docx |
| Descriptions of the study courses/ modules | Programmas ENG.rar | Programmas LV.rar |
| Description of the Study Direction - Other mandatory attachments | | |
| Sample of the diploma to be issued for the acquisition of the study programme. | Diploma of Bachelor and supplement.rar | Bakalaura diploms un pielikums.zip |
| Description of the Study Programme - Other mandatory attachments | | |
| Document confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Confirmation of the higher education institution/ college that 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 according to European language levels (see the levels under www.europass.lv), if the study programme or any part thereof is to be implemented in a foreign language. | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| If the study programmes in the study direction subject to the assessment are doctoral study programmes, a confirmation that at least five teaching staff members with doctoral degree are among the academic staff of a doctoral study programme, at least three of which are experts approved by the Latvian Science Council in the respective field or sub-field of science, in which the study programme has intended to award a scientific degree. | | |
| If academic study programmes are implemented within the study direction, a document confirming that the academic staff of the academic study programme complies with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Institutions of Higher Education | LLU_apliecinajumi_Razosana_parstrade_EN.docx | LLU apliecinajums_Razosanas_parstrades_virzienam.edoc |
| Sample (or samples) of the study agreement | Study_Agreement_LV_EN_2021.pdf | Studiju_ligums_2021.pdf |
| If academic study programmes for less than 250 full-time students are implemented within the study direction, the opinion of the Council for Higher Education shall be attached in compliance with Section 55, Paragraph two of the Law on Institutions of Higher Education. | bak_stud_progr_Pārtikas kvalitāte un inovācijas_AIP atzinums_EN.docx | bak_stud_progr_Pārtikas kvalitāte un inovācijas_AIP atzinums.edoc |