

APPLICATION

Study field "Architecture and Construction" for assessment

Study field	<i>Architecture and Construction</i>
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Self-evaluation report

Study field "Architecture and Construction"

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:

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

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 that 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 the 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).

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 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
8	Power industry, electrical engineering and electrical technologies	1	1			85	TF
9	Sociology, Political Science, and Anthropology	2	1	1		68	ESAF

No	Study direction	Number of programmes				Number of students (01/10/2020)	Faculties
		Total	B	M	D		
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 in the table.

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

	Total	incl. women
University personnel	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
assistants	0	0
leading researchers and researchers	91	44
Academic staff members – professors, associate professors, assistant professors, lecturers or assistants – 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

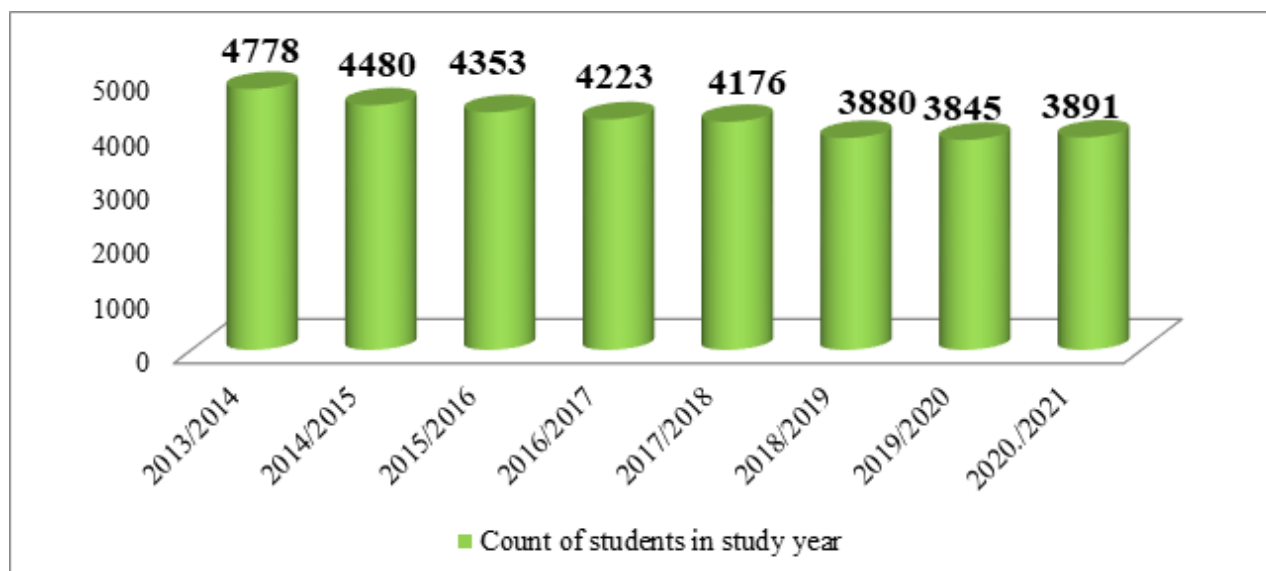
of which foreign visiting professors, visiting assistant professors, visiting lecturers	21	4
Distribution of <i>academic staff members</i> by age:		
under 25 years	0	0
25-29 years	4	3
30-34 years	21	12
35-39 years	49	24
40-44 years	39	28
45-49 years	46	32
50-54 years	30	24
55-59 years	31	23
60-64 years	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 teaching staff 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 for more than 4,000. The decrease in the number of students over the six-year period reflects overall negative demographic trends concerning 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.



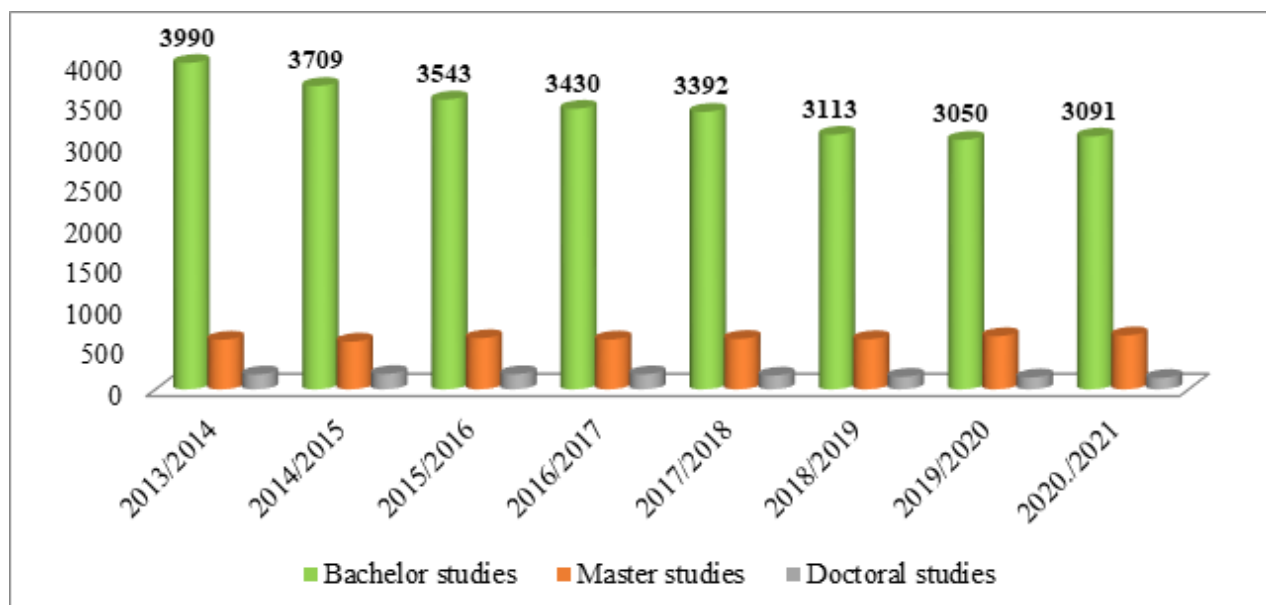
After the university had succeeded in tackling with the external factors affecting the number of students, a number of reasons for the decrease in the number of students were established; the reasons were identified from the analysis of the matriculation of students.

The major reasons are as follows:

1. There was a considerable increase in the amount 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:

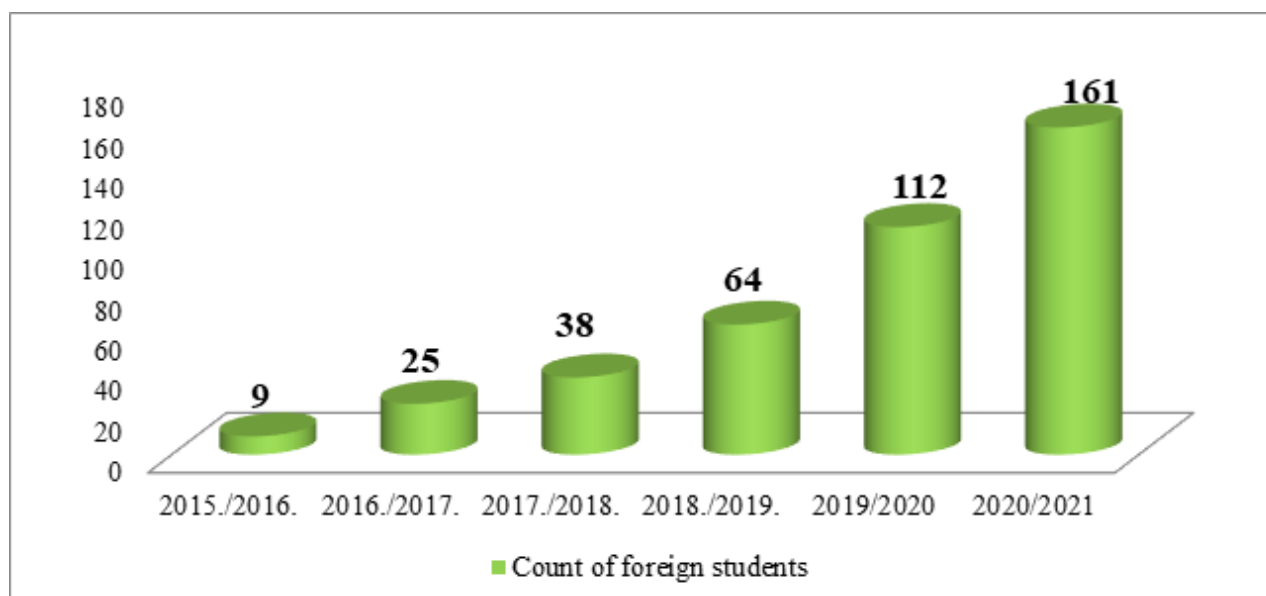
1. Bachelor's degree studies – 79-84%;
2. Master's degree studies – 13-17%;
3. Doctoral studies – 4%.



The analysis of changes in the number of students distributed by level of studies allows concluding that the numbers of undergraduate and doctoral students were the most volatile (a negative trend). The decrease in the number of undergraduate students could be rationally explained as follows: over the six-year period, several study programmes were consolidated; the regional affiliates of LLU were closed; the decrease in numbers of part-time students was observed in particular. 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 the levels of studies) in the academic year 2020/2021.



2. Students are given an opportunity to acquire a bachelor's degree of social sciences in sociology in the form of e-studies.
3. As regards the conventional study process, teaching staff members use the Moodle online system intensively as a support tool for e-studies (learning materials, multiple choice tests, tests, homework etc.);
4. Infrastructure for studies and research has been improved and modernised.

5. Opportunities to receive scholarships funded by patrons tend to increase.
6. LLU provides doctoral students with internal research grants.

Research activities and motivation measures for the academic staff are defined in the LLU Development Strategy, the relevant targets set have to be achieved by the Faculties, administrative centres and scientific institutes and laboratories. Each organisational unit of LLU approves these plans for an annual period. The decision-making bodies of the organisational units have to approve the targets set and the procedure to achieve the targets. Each organisational unit collegially reports on the progress to the LLU Rectorate, and the details of the implementation of the plans are published on the LLU intranet: <https://mans.llu.lv/lv>, they and are available to the academic staff and students.

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 key (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> (only in Latvian)

The **Senate** is a 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://www.llu.lv/lv/senats> (only 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 – List of main internal documents of LLU.

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 standards 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.	<p>Complies</p> <p>Investor in Excellence certificate issued in 2016 Detailed information is provided in Section 1.3 and 2.1 of the report.</p>
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.	<p>Complies</p> <p>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. The Regulation stipulates that:</p> <ol style="list-style-type: none"> 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; 2. The programme developed shall be discussed by the Board of Studies and recommended for approval by the Senate; 3. The Senate shall approve the programme and a director for the programme; 4. Relevant documents shall be submitted to the Academic Information Centre for being licensed; 5. New students shall be admitted to LLU and enrolled in the programme after the licence has been granted. <p>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 (only in Latvian)</p>

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.	<p>Complies</p> <p>The students' learning outcome assessment system is described in:</p> <ul style="list-style-type: none"> • Regulation of Studies (bachelor's and master's degree studies). • Regulation of Doctoral Studies. <p>The requirements for assessing students' learning outcomes for each particular course are given in the descriptions of course study programmes available in Latvian and English in the LLU IS course register at https://lais.llu.lv/pls/pub/kursi.startup?l=1</p>
4.	Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.	<p>Complies</p> <p>LLU has developed procedures and regulations (approved by the Senate) to guarantee the qualifications and work quality of academic staff:</p> <ol style="list-style-type: none"> 1. The LLU Regulations on Academic Positions (File in the attachments section in the folder "LLU Documents in English"). 2. The Regulation regarding the Calculation of Academic Workload (File in the attachments section in the folder "LLU Documents in English"). 3. The Motivation System for LLU Academic Staff (File in the attachments section in the folder "LLU Documents in English"). 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 (for part-time studies - before the beginning of the examination period) - https://www.llu.lv/lv/nodarbibu-grafiki (only 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.	<p>Complies</p> <p>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.</p> <p>For financial planning and accounting, LLU employs the accounting system Horizont 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:</p> <p>Faculties – during the dean's office meetings; 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.</p>
6	The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study direction whilst implementing their quality assurance systems.	<p>Complies</p> <p>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 (Only in Latvian).</p>

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.

Importance of the study direction Architecture and Civil Engineering in the Latvian economy

The direction of study Architecture and Civil Engineering implemented by LLU plays an important role in the overall development of the Latvian economy, as it includes specialties and areas that are

responsible for both sustainable land management and planning, and environmental development and construction, including the use of local natural resources. Thus, this direction is responsible for ensuring the quality of the living environment and space, sustainable management and use of natural resources, spatial planning and smart development. All these aspects are emphasized in several international strategies that are important today, for example, the **UN General Assembly resolution of 25 September 2015 “Transforming our world: 2030 Agenda for Sustainable Development”**. It is the first global document to set out general and comprehensive action. This resolution sets out 17 sustainable development goals, encompassing economic, social and environmental aspects. The principles of sustainable development and the green economy are also included in a number of other international strategies, such as the **European Green Deal**. These initiatives are also related to the provision of biodiversity, ecosystem services, development of solutions adapted to climate change (**EU Biodiversity Strategy; EU Green Infrastructure Strategy**, etc.). These principles, in turn, are included in the Sustainable Development Strategy of Latvia and in several initiatives based on the introduction of the circular economy in Latvia (**Latvian Bioeconomy Strategy**, etc.). Good quality living environment and development of territories, including strengthening of national identity, is also included in several strategic documents of Latvia, such as the **National Development Plan for 2021-2027, the Sustainable Development Strategy of Latvia for 2030**, etc.

The thematic areas of the programmes implemented in the field of studies Architecture and Civil Engineering at the LLU are also in line with several important sectoral documents, in the adoption and implementation of which education and research play an important role. For example, the **Construction Industry Development Strategy for 2017-2024 of Latvia** notes that one of the goals in the Latvian construction development is to attract smart and qualified specialists and to develop efficient construction processes. The strategy, as well as the **Construction Law**, as amended in 2014, emphasize the quality of the construction process at all levels, including the digitization of the construction process. These findings are purposefully included and emphasized in all programmes implemented in this study direction. In turn, the **European Landscape Convention**, which focuses on the identification, preservation and transmission of the specific characteristics of each country's landscape to future generations, as well as the right of everyone to a quality living environment and the surrounding landscape. The aim of the **Territorial Development Planning Law (2011)** is to ensure that territorial development is planned in such a way as to increase the quality of the living environment, use the territory and other resources sustainably, efficiently and rationally, and ensure purposeful and balanced development of the economy. Similar findings are included also in the **Land Management Law**.

Prudent use of land and natural resources is also defined in the vision of LLU, which emphasizes the sustainable use of natural resources to increase the quality of life of the society. The research blocks of the programme are in line with the directions set in the LLU development strategy for 2015-2022:

- Sustainable civil engineering, development of new, innovative building materials and research of their properties;
- Safety and long-term operation of building structures;
- Remote sensing, geodesy and geospatial research;
- Research and development of urban and rural landscape;
- Land and real estate management research.

Implementation of the study direction Architecture and Civil Engineering in the Latvian economy

According to the data indicated on the website of the Higher Education Quality Agency

(<https://eplatforma.aika.lv/>) as of 1.04.2021. in total, in Latvia, the study field Architecture and Civil Engineering is represented by 38 accredited study programmes in 7 higher education institutions. Those being:

- Riga Technical University (RTU) - 20 study programmes;
- **Latvia University of Life Sciences and Technologies (LLU) - 9 study programmes;**
- University of Applied Sciences (RISEBA) - 2 study programmes;
- Riga Construction College (RCK) - 4 study programmes;
- University of Latvia (LU) - 1 study programme;
- Rezekne Academy of Technologies (RTA) - 1 study programme;
- Vidzeme University College (ViA) - 1 study programme.

Only two higher education institutions (RTU and LLU) provide studies at all levels (1st level, Bachelor's, Master's and doctoral studies) in several specialties (civil engineering, geodesy / land surveying, landscape architecture / architecture, etc.), including providing the opportunity to study at a doctoral level. The LLU has established close cooperation with higher education institutions that implement 1st level professional higher education study programmes in civil engineering (RCK, RTA, ViA), providing an opportunity for graduates to continue their studies in senior courses in LLU professional Bachelor's study programme Civil Engineering (part-time studies) and obtain qualification of a building civil engineer in a shorter period of time. Cooperation also takes place with RTU, ensuring the work of the joint council of professors in the field of architecture, participation of LLU and RTU lecturers in theses commissions and Doctoral Councils, cooperation in reviewing scientific articles.

Implementation of the study direction at the LLU, and economic and / or social substantiation of the study programmes included therein

The LLU study direction Architecture and Civil Engineering includes sub-fields of land management, landscape architecture and planning and civil engineering, which in turn cover several levels of higher education study programmes - the first level professional higher education programme; professional and academic Bachelor's study programmes; professional and academic Master's study programmes, doctoral study programmes. In total, 12 programmes were accredited in the study direction Architecture and Civil Engineering at the LLU in the reporting period. Since 2013, LLU has implemented several activities to reduce the fragmentation of study programmes and develop new study programmes that correspond to modern trends, industry demand and current events. As a result, 6 study programmes have been closed in the reporting period, another programme will be closed in the academic year of 2021/2022, 3 study programmes have been newly created and licensed, and in 2 programmes significant changes have been implemented. **Currently, 8 study programmes are submitted for accreditation.** At the Latvia University of Life Sciences and Technologies, the study direction Architecture and Civil Engineering includes the following subfields and study programmes:

- *Surveying and land management* (professional Bachelor's study programme Land Management and Surveying).
- *Civil engineering, civil engineering science* (first level professional higher education programme Civil Engineering, professional Bachelor's study programme Civil Engineering, professional Master's study programme Civil Engineering, doctoral study programme Civil Engineering).
- *Landscape architecture and planning* (academic Bachelor's study programme Landscape Architecture and Planning, professional Master's study programme Landscape Architecture and Planning, doctoral study programme Landscape Architecture).

The leading departments of the study programme are located at the Faculty of Environment and

Civil Engineering (VBF) (until 2016 at the Faculty of Rural Engineering). The Faculty of Environment and Civil Engineering of the LLU has **accumulated many years of experience** in implementing the subfields and programmes of the study direction Architecture and Civil Engineering. The beginnings of the professional higher education Bachelor's study programme "Land Management and Surveying" are found at LLU in 1947, when the Faculty of Land Management was established at LLU, where engineers - land developers were trained. The civil engineering subfield implemented by LLU has more than 60 years of experience in civil engineering education, initially developing as a field of agriculture / rural construction. The sub-field of landscape architecture at LLU was started to be implemented together with the establishment and development of this field in Latvia in 1994, forming and still continuing a close cooperation with the Latvian Association of Landscape Architects (formerly Latvian Society of Landscape Architecture, established in 1995).

The development strategy of the construction sector points to the lack of highly qualified specialists and managers in the field, which forms the **economic substantiation** for the implementation of the programmes of the study direction. Although it is difficult to forecast long-term demand in the construction sector, according to experts, the most plausible scenario is an increase in labor demand with the possibility of cyclical fluctuations inherent in the construction sector as a whole, given its sensitivity to changes in the economic situation as a whole. The labour market in the construction sector is strongly influenced by the overall economic development, the EU funds planning priorities and large infrastructure objects (for example, Rail Baltica), which account for a significant share of public procurement in construction. In order to meet the needs of the industry regarding the number of specialists and the increase in the quality of professional qualifications, it is necessary to improve civil engineering education and professional qualification system. In the next 10 years, the engineering knowledge of the construction industry will have to be integrated with new competencies: ICT technologies, smart manufacturing, energy efficiency, passive house construction, smart development, etc. Therefore, despite the extensive experience of the implementation of the study direction, the content and form of the programmes included in it are constantly improved and updated in accordance with the demand and current developments of the sector. For example, study plans have been revised to include more courses that include ICT technologies and digitization components (Building Information Modeling (BIM) in civil engineering, use of geospatial data in land management, site exploration and planning, development of 3D scenarios and virtual walks in landscape architecture). Updating the programmes in accordance with the tendencies of the industry, including improving the study infrastructure and providing professional development for the teaching staff of the programmes, allows to prepare knowledgeable and professional specialists. Over time, it is planned to create continuing education programmes (through the LLU Lifelong Learning Centre (LLC)) for those already working in the field, which would also allow them to adapt to the latest trends in the field. Already now, anyone interested has the opportunity to apply through the LLC to the study courses implemented in the programmes that interest them, and to attend them as listeners. The ability to adapt to the latest trends is closely linked to the economic rationale for the implementation of the programmes, which is closely related to the industry's demand for specific specialists.

The **social rationale** for the development and implementation of the programmes is the link between the programmes and the strategic goals of sustainable development, in particular the responsible use of resources, the creation of an inclusive and high-quality living environment for all social groups, everyone's right to a clean and attractive environment. In all study programmes, close co-operation with the local governments takes place in terms of the study process and research, jointly implementing study and research projects, involving and educating local government residents (developing territorial development plans, providing guest lectures, involving the public in various project activities).

Uniqueness of the study programmes of the study direction Architecture and Civil Engineering implemented by LLU and comparison with other programmes

The fields represented at LLU - **landscape architecture, land management and rural construction (agricultural buildings, development of construction materials and construction from local natural resources (wood, hemp, gypsum), hydraulic engineering)** are unique in the Latvian context, which means that specialists in these fields are trained only at LLU. These unique areas are also in line with the strategic specialization of LLU, which is mainly focused on the bioeconomy, intelligent use and management of natural resources, as well as sustainable development of territories. Compared to the civil engineering study programmes offered by other Latvian higher education institutions, the programmes implemented by LLU place great emphasis on the design of buildings related to the extraction and processing of bioresources, agricultural buildings and hydraulic structures, including current issues of GHG emission reduction, building energy efficiency, and acoustics - environmental, detection and prevention of industrial and domestic noise.

Within the framework of the ESF project “Improvement of the Management of the Latvia University of Life Sciences and Technologies” (No. 8.2.3.0/18/A/009) implemented by the LLU in the academic year of 2019/2020, foreign experts were engaged to compare the Architecture and Civil Engineering programme to the programmes implemented at other foreign universities. The experts acknowledged that in terms of content, the programmes of the study direction include the latest trends in the field (e.g. BIM, adaptation to climate change, sustainable development, etc.), the main differences are the duration and form of studies (academic or professional study programme or programme without such a division), which generally depends on the specifics of the education system of each country, as well as the guidelines developed by each industry regarding the length of studies for the acquisition of a professional qualification. Also, in some cases there were differences in the organization of the acquisition process of the topics of the study programmes (emphasis on sequential building of understanding or individual themes, modules etc.). In general, no significant differences were found in the content of the study programme, which would significantly affect the quality of studies, as well as in the knowledge, skills and competencies acquired in the programme.

Interconnection of programmes of the study direction

All programs of the LLU study direction Architecture and Civil Engineering are included in the implementation processes of the construction industry, therefore their interconnection is high both vertically - between different study levels and horizontally between the thematic areas of the study direction. Taking into account the close connection, the Bachelor's study programmes mainly include topics from other fields representing the study programme, for example, the professional Bachelor's study program Land Management and Surveying includes the study course *Planning of Farm Territory*, which includes topics related to the development of territory. In its turn, the study course *Surveying* is implemented in the academic Bachelor's study programme Landscape Architecture and Planning. The Bachelor's study programs in Civil Engineering and Landscape Architecture and Planning include study courses related to the development of spatial thinking and drawing, which is necessary for work with spatial objects (buildings, greenery, outdoor elements, etc.). Consequently, the teaching staff of various VBF departments are involved in the implementation of the study courses of the programme of the study direction, creating a better understanding of the interconnection of the sub-branches of the direction. Also, graduates of the programme have the opportunity to continue their studies in the field of Architecture and Civil Engineering, as well as in other study fields implemented by LLU, for example, graduates of the professional Bachelor's study programme Land Management and Surveying can continue their studies in the Master's programme but after graduating from this programme, to study for a

doctorate in the doctoral study programme in Civil Engineering. During the reporting period, several interdisciplinary research projects were implemented, which involve academic staff members of various study programmes. For example, the Latvian-Lithuanian cross-border cooperation project on the regeneration of brownfields, in which the lecturers of the study programmes of Land Management and Surveying and Landscape Architecture and Planning cooperated; in addition to the above-mentioned programmes, the academic staff members of construction programmes also participated in the project on the use of GIS in various sectors.

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 **goals** of the study direction Architecture and Civil Engineering are based on:

- the goals and three action programmes (education, research, administration) specified in the LLU development strategy for 2015-2022;
- the shortcomings identified in the international evaluation of the study directions (2011/2012) and the proposals put forward;
- general tendencies of higher education development and branches in Latvia and Europe;
- social and economic development needs and development trends.

According to the vision of the LLU, the Latvia University of Life Sciences and Technologies is one of the leading universities of science and technology in the Baltic Sea region, **specializing in the sustainable use of natural resources and improving the quality of life of the society.**

The mission of LLU is to create internationally competitive intellectual potential, based on excellence in research, application of research results in the national economy, high quality of studies and efficient management of the University. The University's mission includes four top-level goals:

- to achieve excellence in research specialization areas;
- to promote fundamental and applied research, application of research results in the national economy;
- to provide high quality study and lifelong learning services;
- to ensure effective management of the University.

In order to achieve the goals, three action programmes have been developed and included in **the LLU development strategy aiming to achieve these goals:**

- research programme;
- education programme;
- management improvement program.

The goals set in the study direction Architecture and Civil Engineering closely coincide with the common goals and action programmes set out in the LLU development strategy. The goals of the study direction Architecture and Civil Engineering are:

- to provide **high-quality studies and further education opportunities** in the fields of land management and geodesy, civil engineering, landscape architecture and planning, ensuring the **recognition and competitiveness** of the study direction and the programmes included therein in solving topical issues and strengthening fundamental knowledge;

- to promote **the integration of studies and research**, the **transfer of innovation into the national economy**, the **scientific succession** and the development of science schools in the area of land management and geodesy, civil engineering, landscape architecture and planning;
- **to promote the internationalization and international recognition** of studies and research, to develop the Baltic-wide landscape architecture study and science centre in Valdeka castle, GIS Competence Centre and scientific laboratory in the VBF study building, to strengthen cooperation in studies and research with foreign higher education institutions in the fields of land management, civil engineering and geodesy, landscape architecture and planning;
- to ensure the quality of studies and research environment, student-oriented **management of the study direction** to promote learning.

Sustainability, adaptation to the changing technologies and current developments in the field and competitiveness are put forward as the main drives of the development of the study direction Architecture and Civil Engineering. These principles are emphasized in the LLU development strategy and correspond to the general development trends in the field of education in Latvia and Europe. Consequently, these principles are also subordinated to each other in all spheres of activity of the study direction Architecture and Civil Engineering, thus providing opportunities for growth and improvement of the direction.

The main directions of further activities of the study direction Architecture and Civil Engineering, similarly to the action programmes specified in the common strategy of LLU are: implementation of the **study process, scientific activity and innovation transfer**, improvement of **management**. Improving management should also include improving the **social environment** by creating a positive work, study and leisure environment, promoting mutual communication between academic staff, other faculty members, students and management.

In order for the development of a direction of study to be sustainable, all these direction must support and complement each other, as well as feedback must be formed between them. Scientific activity must support and contribute to the improvement of the study process, and vice versa - in the study process, in addition to practical training, it must also provide understanding of the scientific field, ensuring the introduction of innovation to the industry. Competitiveness is ensured by the development of specific directions, adaptation to the changing trends of the industry (for example, digitalization of construction processes and management), as well as high quality of studies and further opportunities in the labour market.

The LLU study direction Architecture and Civil Engineering has great potential in all the above-mentioned directions of activity, as it represents the sub-fields supporting the development of the Latvian economy - land management and surveying, civil engineering, including hydraulic construction and rural construction, landscape architecture and planning. These directions are aimed at the sustainable use of natural resources to improve the quality of the living environment of the society. The topicality and importance of the direction in the national economy is evidenced by the already active **cooperation with the industry both in the implementation of the study process and in research. Students are involved in real research and projects that address issues important to municipalities or companies**, solving research and practical tasks. It is also in line with the professional and business orientation of LLU and the programmes implemented by it. Surveys of graduates also show that the study programmes of the study direction Architecture and Civil Engineering are topical and in demand in the industry, because, on average, about 90% of the graduates work in the specialty, depending on the sub-field. Most students of the professional Bachelor's study programmes already start working in the field during their studies in senior courses. Master's and doctoral students are mainly focused on the acquisition

of multifaceted knowledge and professional development, which is often determined by work in state-owned companies or universities.

Within the study direction, the same **research areas are purposefully strengthened**, which have been developed at LLU VBF for many years, developing the necessary infrastructure, encouraging students to choose these areas in their research works, including in their doctoral theses. Such an approach promotes the **visibility, scientific succession and purposeful development** of the research areas implemented in the study direction. For example, the topic of the dissertation defended in 2013 is the inelastic deformation and durability of steel short-fiber concrete, where one of the practical contributions of this work was the proposal based on fib Model Code 2010 for the Latvian Standard LVS EN 1992-1-1 appendix, which was submitted to the Standardization Technical Committee LVS / STK 30 Construction. Since 2019, there has been regular research in new, steel fibre reinforced concrete composites, which are ordered by such companies as SIA "Dzelzsbetons MB" and SIA "Piche". Within the framework of the topic, students of both undergraduate and Master's study programmes develop their research works.

The academic staff members of the programmes is recognized in the industry, as evidenced by the invitations to give guest lectures to industry professionals on current topics in the industry, as well as to conduct research commissioned by industry companies.

In accordance with the **LLU development strategy and strategic specialization in the field of bioeconomy**, special attention is paid to the following topics in the content of the study programmes of the study direction Architecture and Civil Engineering:

in study programmes in Landscape Architecture and Planning:

- Landscape ecology and environmental protection (including ecosystem services)
- Nature territories (including forest landscape planning, nature tourism)
- Greenery concepts (including green infrastructure, adaptation to climate change, urban gardening, public participation)
- Sustainable landscape development
- Design of industrial territories (including revitalization of degraded territories, remediation of pollution by phytoremediation method)
- Digital tools; Geographic information systems
- etc.

in study programmes in Civil Engineering:

- Wood constructions, wood engineering
- Building materials and their technology (including construction based on the use of biomaterials)
- Ecological construction
- Agricultural buildings
- Building Information Modeling (BIM)
- etc.

in study programme Land Management and Surveying

- Land management (including rational and intelligent land resource management)
- Spatial planning (including sustainable territorial development)
- Geographic information systems
- etc.

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.

Objectives of the study direction Architecture and Construction:

The goals of the study direction Architecture and Civil Engineering are:

1. To provide **high-quality studies and further education opportunities** in the fields of land management and geodesy, civil engineering, landscape architecture and planning, ensuring the **recognition and competitiveness** of the study direction and the programmes included therein in solving topical issues and strengthening fundamental knowledge

<i>Strengths</i>	<i>Planned actions to exploit strengths</i>

<p>1. The uniqueness of the direction programmes and the high demand for the graduates of the programmes</p> <ul style="list-style-type: none"> - Acquisition of landscape architecture, land management, rural and hydraulic construction only in the context of LLU in Latvia - There is a great demand for graduates and students of the specialty in the labour market <p>2. Significant experience in the implementation of the programmes of the study direction</p> <ul style="list-style-type: none"> - 75 years of experience in the field of land use planning, more than 60 years in the field of civil engineering, and more than 25 years of experience in the field of landscape architecture <p>3. Diverse content of the programmes and practical approach</p> <ul style="list-style-type: none"> - Relatively diverse range of study courses in study programmes that develop students' skills in solving a wide range of industry issues - A large proportion of academic and professional internships, which form a close connection with the acquired profession and ensure work-based studies. 	<p>1.,2.,3.</p> <p>Actively use “uniqueness”, “experience” and “work-based studies” as key elements for building the recognition and prestige of the study direction and the programmes included in it, to confirm stability and increase competitiveness.</p>
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4. Knowledgeable and highly qualified academic staff members

- In recent years, several academic staff members have improved their qualifications by obtaining a scientific degree. Succession of the academic staff members, formed by both the professorship and the new lecturers.
- Experience of the academic staff members in the implementation of research and practical projects. Linking the academic staff members to internship, which ensures continuous professional development, several academic staff members have internship certificates.
- Active participation of the academic staff members in international organizations, institutional commissions and working groups.
- Faculty mobility within the ERASMUS + and NordPlus programs for lectures and gaining experience.
- Opportunities to attract outstanding specialists from Latvia and Europe within the VBF budget, ERASMUS +, BOVA, Swiss grant and other programmes (for example, Professor S.Bells of the Estonian University of Life Sciences, who has also been a visiting professor at LLU since 2013).

4.

To popularize the **competence and qualification of the academic staff members** as key elements in the implementation of **high quality studies and further education**.

To create a **portfolio and CV database** of the academic staff members involved in the field, which is freely available to prospective students, participants of further education programmes, as well as potential research cooperation partners and research clients.

To plan annually **support tools for raising the qualification of academic staff members** through various professional

development courses, internships in companies and scientific institutions, participation in conferences and seminars.

To plan annually to **attract at least 3 foreign visiting professors (one in each field)** for the acquisition of specific topics in the study process, using EU programme grants and VBF funding.

5. Student-oriented studies

- The study process is organized in optimal groups of students, which allows to provide an individual approach to students and, consequently, to prepare highly qualified young specialists.
- Use of modern technologies and e-environment for more effective feedback in the study process.
- LLU internal support grants for doctoral students
- Corporate support for students - ITERA LATVIJA, UPB, PERI scholarships for the best students of landscape architecture and construction specialties, as well as ITERA Latvia grant for scientists in landscape architecture.
- Possible student mobility within the ERASMUS + and NordPlus programmes for studies and internships.

5.

In cooperation with students, work on improving the quality of studies, at least twice a year to identify the main issues to be addressed and further actions to be taken. Introduce curators to support students in resolving unclear issues and getting to know the study process.

Twice a year to implement informative events for students to introduce the possibilities to receive support (company scholarships, LLU internal grants).

Twice a year to implement informative events for students about mobility opportunities. Actively use the interactive tools offered by the e-learning environment to improve the study process. To provide professional development courses for teachers for the effective use of e-environment tools. Regularly conduct surveys of students, graduates and employers to identify necessary improvements in the study process.

<p>6. Developed study environment and modern teaching methods</p> <ul style="list-style-type: none"> - In recent years, by attracting EU funding, LLU has developed a study and science infrastructure - modern computer classrooms with up-to-date software, laboratories and equipment for field research. Including unique laboratories in the Latvian context - Photogrammetry Laboratory, Geodetic Instruments Calibration Laboratory, Acoustics Laboratory. - Good base of scientific and practical literature, including free access to valuable databases. - Application of modern methods in the implementation of studies, various use of e-studies. Adaptation and flexibility in planning and managing the study process. - Students have access to work 24 hours a day, 7 days a week (in the building of Valdeka castle, partly in the study building of VBF) 	<p>6.</p> <p>Taking into account the availability of high-performance workstations and specific software, to develop further education programmes for the acquisition of current digital tools in all sub-branches of the study direction (BIM programs, 3D modeling, ArcGIS, etc.).</p> <p>Taking into account the uniqueness of individual laboratories in the Latvian context, to work on innovative solutions in cooperation with the industry, including by involving students.</p> <p>To develop procedures for students to work in classrooms, laboratories and computer classes outside working hours, providing an opportunity to study 24 hours a day, 7 days a week (currently such an opportunity is provided in the building of Valdeka Castle, partly in the study building of VBF).</p> <p>To improve methodical offices in Valdeka Castle and VBF study building, to develop infrastructure that students can use in the form of self-service (printers, simple equipment, etc.).</p> <p>Regularly review the sources of information used in the study courses, supplement the LLU Fundamental Library and Valdeka Castle and VBF methodological cabinets with the latest literature in the field, including electronic resources.</p>
<p>7. Diversity and interconnection of sub-fields represented in the study direction</p> <ul style="list-style-type: none"> - The civil engineering, land management, landscape architecture and planning sub-fields of the study direction are working together in the practical implementation of the civil engineering processes, as well as in joint research. 	<p>7.</p> <p>Promote cooperation between the academic staff of the sub-fields of the study direction in implementation of joint projects and research. Develop interdisciplinary training modules for further education and professional development.</p>

8. Cooperation with other Latvian educational institutions

- Cooperation with RTU Faculty of Architecture and Urban Planning, Faculty of Civil Engineering, RISEBA and others in organizing student plein airs, organizing conferences, engaging guest lecturers, organizing Doctoral Councils.
- Cooperation with industry colleges, technical schools and secondary schools, promoting the engagement of the best students for studies at LLU. Cooperation with Bulduri Horticultural Secondary School, implementing joint projects, participating in the training process.

8.

To regularly maintain co-operation with other Latvian higher education institutions, to promote the regularity of activities to be implemented within the framework of co-operation (annual plein airs, summer schools, conferences, etc.).

Cooperation with the academic staff members of other Latvian higher education institutions for the management of specific topics for students of the programmes in the study direction.

Regularly maintain co-operation with industry colleges and technical schools, planning annual joint activities (thematic workshops, use of laboratories in the teaching process, involvement of the teaching staff in the study process of the schools).

To offer research topics for the development of scientific research work within the school curriculum.

To continue to provide an opportunity for the best students of the specialized schools to start studies in programmes of the study direction outside the competition.

<p>9. Cooperation with the industry and practical training</p> <ul style="list-style-type: none"> - Cooperation with local governments and entrepreneurs, giving the opportunity to work on real projects and situations within the framework of study courses and diploma projects. - Attracting guest lecturers from the field (about 30 each study year) 	<p>9.</p> <p>In cooperation with the branches, to establish working groups for regular discussion on topical issues in the field and the necessary improvements of the study process, qualities of graduates. Conduct regular employer surveys.</p> <p>In cooperation with the industry, identify the necessary thematic blocks that would be implemented within the framework of further education, as separate study modules, specializations or new study programmes (GIS engineer, BIM engineer, landscape management specialist).</p> <p>In cooperation with the companies of the industry, to regularly organize internships (in landscape architecture study programmes), meetings with potential employers or trips to the companies of the industry to choose the place of internship.</p> <p>In cooperation with companies of the industry, regularly organize guest lectures or thematic seminars for the acquisition of specific topics (on average 30 lecturers per study year).</p>
<p>10.LLU Lifelong Learning Centre</p>	<p>10.</p> <p>Development of new continuing education programmes for existing professionals in the field to increase their current competencies, implementation of these programmes in cooperation with the Lifelong Learning Centre of LLU.</p>
<p><i>Weaknesses</i></p>	<p><i>Planned actions to address weaknesses</i></p>

1. Duration and forms of

implementation, content and volume of study courses of some study programmes

- Compared to European and other Latvian universities, some study programmes have a longer study duration for obtaining a Bachelor's degree, as well as in doctoral programmes, which lowers the competitiveness of the programmes.
- Some general study courses, which are implemented by other structural units of LLU, are more focused on the development of a general understanding, rather than have a branch-specific orientation, as they are implemented in large groups with students from other fields.

1.

To review the duration of study programmes, at the same time reducing the volume of general study courses, emphasizing more industry-specific study courses. In doctoral studies, to examine the possibilities for their implementation within 4 years, taking into account the experience of extensive research work in European universities.

Taking into account the growing competition in higher education, as well as the decrease in the number of students, it is important to identify the latest trends in the industry and cover current topics within the study courses. Consequently, new **study programmes or courses could be developed, including in further education**, or the existing ones could be improved:

- *optimization of study courses*, which would include intensive acquisition of study course material, offering courses in the form of modules (study courses are planned in blocks) or as integrated study courses (courses that complement each other are acquired simultaneously). Optimization of study courses would be useful in study courses where the number of students is small. Integrated courses are also used successfully in other European universities.
- *cooperation with other LLU study programmes*, which would allow to develop multidisciplinary study courses in further education programmes. Following the general development trends in Europe, a multidisciplinary approach in various fields is becoming increasingly important. Such paid study courses would also be suitable for existing specialists who would like to comprehensively expand their knowledge in the field;
- *creation of prospective and innovative study programmes or improvement of the existing ones based on the state and market demand* (GIS engineer, BIM engineer, landscape management specialist).

2. Decrease in the number of newly admitted students due to the demographic factors of Latvia, attraction of students

- The issue of attracting students has become topical with the decrease in the number of students, as well as the outflow of youth to foreign countries or to the capital city.

2.

It is possible to attract young people to studies by engaging them in a simplified and understandable way, as well as by emphasizing the importance of the branches of the study direction in the Latvian and European context:

- *cooperation with vocational secondary schools*, which would include organizing joint events with the students of the faculty, implementation of joint projects, use of the faculty laboratories and exchange of experience, thus attracting students of vocational secondary schools to study in the programmes of the study direction;
- *events at the faculty and in schools, in cooperation with the Communication and Marketing Centre of LLU*, which would include an range of interesting activities for secondary school students, at the same time promoting the specialties acquired at the faculty and attracting secondary school students to the studies in the programmes of the study direction;
- *attracting foreign students*. As the number of local students decreases, programmes in English must be developed, as well as popularized abroad. One of the ways is to establish cooperation with foreign professional colleges, also professional industry associations, etc .;
- *regular publicity in social and sectoral networks, updating of the VBF website*, which would allow the prospective student to follow the activities at the faculty and develop interest in studying in the programmes of the study direction.

<p>3. Low number of students in Master's study programmes</p> <ul style="list-style-type: none"> - Given the dynamic labour market, many undergraduates choose to start their careers as soon as possible (sometimes even during their studies), which reduces interest in studying for a Master's degree. 	<p>3.</p> <p>To develop new programmes or specializations that would allow Master's studies to specialize in the most relevant topics of the industry (for example, BIM, GIS, landscape management), which would be attractive for those already working in the industry.</p> <p>Attracting foreign students and developing study programmes in English. As the number of local students decreases, study programmes must also focus on the foreign students.</p>
<p>4. Student dropout</p> <ul style="list-style-type: none"> - Students drop out in the first year due to insufficient knowledge in sciences, which are important for the acquisition of engineering. - Students drop out of senior courses because almost all students already work in companies in the industry to support themselves. They are often unable to combine work with studies, as well as the industry ensures good salary and thus the studies choose work over finishing their studies. - Insufficient financial support in the form of scholarships for successful students, which would allow full implementation of studies without additional search for other financial sources. 	<p>4.</p> <p>To create an independent support system for strengthening knowledge in sciences for 1st year students (additional classes).</p> <p>Cooperation with the industry and industry companies, promoting understanding of the importance of the completion of studies of their employees (who are students).</p> <p>In cooperation with the industry, work on support programmes (company scholarships) that would allow students to successfully complete their studies, but entrepreneurs to attract highly qualified graduates of the programmes.</p>

5. Attracting industry professionals to the study process, attracting new academic staff members, opportunities to improve current competencies

- The low competitiveness of the salaries of the academic staff members limits the opportunities to attract well-known professionals in the field in the study process, as well as new academic staff members.
- Compared to the industry, low salaries and high levels of bureaucracy reduce the interest in working at a university. The amount of bureaucratic work limits the amount of time that an academic staff member can devote to the implementation of the study process, scientific activity and professional development, including the lack of time for wider literature studies (finding the relevant specific literature, summarizing, collecting data).
- Support tools are needed for the regular professional development of the academic staff, including the improvement of the English language level

5.

The issue of the academic staff member remuneration must be resolved at the state level. The internal support tools of LLU - the motivation system and the bonus for scientific work must be improved in order to simultaneously focus on increasing the quality of studies.

Improvement of the database and information storage system, which would allow to reduce the amount of bureaucratic work.

Regular support tools for professional development of academic staff members, including improvement of English language skills.

<p>6. Outdoor infrastructure development opportunities and industry professional literature in Latvian</p> <ul style="list-style-type: none"> - There is no independent space for students to develop projects, term papers (workshops). - Lack of territory for the establishment of outdoor laboratories for the implementation of the study process and scientific activity of the subfields of land management, landscape architecture and civil engineering. - There is a lack of the latest branch literature in the Latvian language 	<p>6.</p> <p>To develop separate work spaces for students in Valdeka Castle and VBF study building, which would be available 24 hours a day and 7 days a week.</p> <p>For the development of outdoor laboratories, opportunities for cooperation with other LLU study programmes are sought, for example, the agricultural study direction, Bulduri Horticultural Secondary School, as well as purposefully analyzing opportunities to attract funding within projects and in cooperation with industry companies.</p> <p>To develop the study base in Valdeka Castle, acquiring a place for practical training next to the study rooms (park, experimental areas for planting and covering materials, outdoor design exposition areas).</p> <p>To improve the existing motivation system of the academic staff members by providing additional support for the preparation and publication of new teaching aids and scientific monographs in the Latvian language. To the extent possible, include the development of teaching materials within the framework of the implemented projects.</p>
<i>Opportunities</i>	<i>Planned activities to use the opportunities</i>
<p>1. New thematic niches in the field of Architecture and Civil Engineering in higher education</p> <ul style="list-style-type: none"> - Due to the digitalization of the construction industry, there is a need for education in this field (BIM, GIS) - New requirements in the field of civil engineering - New strategies for the green economy, adaptation to climate change, social inclusion 	<p>1.</p> <p>In cooperation with the industry, to develop new study courses, specializations or new programmes (GIS engineer, BIM engineer, landscape management specialist, etc.), further education courses for those already working in the industry.</p>

<p>2. Recognition of LLU in the industry</p> <ul style="list-style-type: none"> - Taking into account many years of experience in the implementation of the study direction programmes and the high level of knowledge of the graduates, the direction programmes are well recognized in the industry 	<p>2.</p> <p>Strengthen cooperation with the industry, develop joint activities to promote the industry and programmes (for example, the construction education campaign “Learn construction”)</p>
<p>3. Available international mobility opportunities</p> <ul style="list-style-type: none"> - Transfer of positive experience gained by students and academic staff members within the framework of Erasmus + and NordPlus programs in the improvement of programmes of the study direction. 	<p>3.</p> <p>Encourage students and academic staff members to use available mobility programs to expand their knowledge and skills, build collaboration with foreign partners on projects and joint education initiatives.</p>
<p>4. Available EU funds for projects and infrastructure</p> <ul style="list-style-type: none"> - Available funds can be purposefully attracted for the development of infrastructure, improvement of study quality, raising the qualification of academic staff members 	<p>4.</p> <p>To develop motivation tools for more active attraction of EU funds, purposefully planning the involvement of human resources in this process.</p>
<p>5. Sectoral support and interest in improving the quality of education</p> <ul style="list-style-type: none"> - Close cooperation with the industry allows for the implementation of measures that significantly increase the quality of studies and connection with practice and current events in the industry. It includes the campaign “Learn construction”, organizing scholarships for industry companies, guest lectures, study tours and other activities. Also, in cooperation with state institutions, ministries have the opportunity to receive information for research and teaching. 	<p>5.</p> <p>Hold regular meetings with industry representatives to discuss cooperation opportunities and industry news. To implement the popularization of the branch among young people, to organize joint campaigns to increase the interest of young people in the field and studies in the LLU programmes of the study direction Architecture and Civil Engineering.</p>
<p><i>Threats</i></p>	<p><i>Planned actions to prevent threats</i></p>

<p>1. Changes in the higher education system and research in Latvia</p> <ul style="list-style-type: none"> - In recent years, there have been significant changes in legislation related to the implementation of higher education and research (e.g. new classification of disciplines, typology of universities, etc.) 	<p>1.</p> <p>Regular review of study programmes (once a year) and, if necessary, updating in accordance with trends in higher education in Latvia and Europe</p>
<p>2. New threats of pandemics or other emergencies</p> <ul style="list-style-type: none"> - Covid experience - Financial crises affecting industry and education in general 	<p>2.</p> <p>To improve programmes and study courses, as well as approaches to their implementation, which would be easily adaptable in emergency situations. Identify possible digital tools, develop a video lecture archive and database</p>
<p>3. Changes in the industry, slower pace of adaptation to new initiatives as an industry</p> <ul style="list-style-type: none"> - New occupation mapping in the construction industry, new occupational standards - The bureaucratic process of the regulatory framework, which hinders the rapid implementation of changes in education 	<p>3.</p> <p>Regularly follow the changes in the sectoral policy, make the necessary improvements in the content of the programmes and study courses.</p> <p>Cooperate with industry for faster implementation of current initiatives in programme content</p> <p>Cooperate with the industry to update the programmes, taking into account the new professional standards</p>
<p>4. Low competitiveness of academic staff member remuneration compared to the industry</p> <ul style="list-style-type: none"> - Insufficient funding for the remuneration of academic staff members and support staff, which endangers the retention of new specialists for the implementation of the study process and scientific activity. 	<p>4.</p> <p>An issue to be solved by the state. Develop and maintain existing support programmes for academic staff members (motivational and science grants for study and research).</p>
<p>5. Increasing competition between universities, driven by a decrease in the number of local students</p>	<p>5.</p> <p>Regularly, in cooperation with the industry, to work on updating the programmes, popularizing the branch, participating in various student attraction campaigns, as well as working in the professional organizations of the branch and the branch commissions of state institutions.</p>

2. To promote **the integration of studies and research**, the **transfer of innovation into the national economy**, the **scientific succession** and the development of science schools in the area of land management and geodesy, civil engineering, landscape architecture and planning.

Attracting scientific research and projects to the direction of studies is essential for its further development. Within the framework of projects, it is possible not only to improve the material and technical base of the faculty, to equip laboratories, but also to create innovative products or services and informatively enrich study courses. Scientific projects are also an opportunity to attract Master's and doctoral students, who would have the opportunity to prepare high-quality scientific works within the framework of the projects.

Strengths	Planned actions to exploit strengths
<p>1. Uniqueness and topicality of the thematic areas of the direction</p> <ul style="list-style-type: none"> - Acquisition of landscape architecture, land management, rural and hydraulic construction only in the context of LLU in Latvia - The thematic areas of the direction cover current topics related to the quality of living environment, "green" construction, adaptation to climate change, digitization of sectors, public participation, etc. 	<p>1.</p> <p>To work on research work in unique and topical topics, purposefully strengthening them, popularizing them in the branch, and creating scientific succession in these branches at LLU, involving students in the research.</p> <p>To develop a database of thematic research offered and already implemented by the field, which can be used in the study process at the same time.</p> <p>To promote the implementation of interdisciplinary research</p>

<p>2. Knowledgeable and highly qualified academic staff members who are active in both practice and research</p> <ul style="list-style-type: none"> - In recent years, several academic staff members have improved their qualifications by obtaining a scientific degree, which allows them to independently manage research projects. - Experience of the academic staff members in the implementation of research and practical projects. - Active participation of the academic staff members in international organizations, institutional commissions and working groups. 	<p>2.</p> <p>To popularize the research experience and practical competence of the academic staff members as key elements for the quality of research at LLU.</p> <p>To create a portfolio and CV database of the academic staff members involved in the field, which is freely available to prospective students, participants of further education programmes, as well as potential research cooperation partners and research clients.</p> <p>To plan annual support tools for the research work of the academic staff members (LLU internal grants, allowances, etc.), regular support for participation in conferences and publication of research results.</p> <p>The academic staff members regularly update the content of the study courses, including the latest findings from the research projects in which they are involved.</p>
<p>3. Student involvement in research, student scientific conferences</p> <ul style="list-style-type: none"> - Regular involvement of students in various project activities - LLU internal support grants for doctoral students, researchers - Cooperation with companies in the development of student research projects (research work, theses) - Support for participation in international conferences, organization of internal student conferences (each field has its own conference every year) 	<p>3.</p> <p>Once a year to update the content of the study courses, including the current research or projects of the department, in which it would be possible to involve students. Thus integrating research into the study process.</p> <p>Meet regularly (1-2x per year) with industry to identify research topics.</p> <p>To motivate and encourage doctoral students to apply for LLU internal grant programmes.</p> <p>Every year to plan student conferences in each of the sub-fields, to support students for participation in other international conferences.</p>

<p>4. Developed research infrastructure and available resources, including publication of scientific journals</p> <ul style="list-style-type: none"> - In recent years, by attracting EU funding, LLU has developed a study and science infrastructure - modern computer classrooms with up-to-date software, laboratories and equipment for field research. Including unique laboratories in the Latvian context - Photogrammetry Laboratory, Geodetic Instruments Calibration Laboratory, Acoustics Laboratory. - Good base of scientific and practical literature, including free access to valuable databases. - International scientific journals "Landscape Architecture and Art" (indexed by Scopus, WoS), "Baltic Surveying" published by the departments, which allow students and academic staff members to publish. 	<p>4.</p> <p>Given the availability of high-performance workstations and specific software, use digital technologies in research projects, especially in field study (ArcGIS, situation modeling software, etc.).</p> <p>Taking into account the uniqueness of individual laboratories in the Latvian context, to work on innovative solutions in cooperation with the industry, including by involving students.</p> <p>To maintain and develop the scientific journals published by the departments, to promote their recognition.</p>
<p>5. Diversity and interconnection of sub-fields represented in the study direction</p> <ul style="list-style-type: none"> - The civil engineering, land management, landscape architecture and planning sub-fields of the study direction are working together in the practical implementation of the civil engineering processes, as well as in joint research. 	<p>5.</p> <p>Promote cooperation between the academic staff of the sub-fields of the study direction in implementation of joint projects and research.</p>
<p>6. Cooperation with other Latvian educational institutions, other structural units of LLU</p> <ul style="list-style-type: none"> - Cooperation with RTU Faculty of Architecture and Urban Planning, Faculty of Civil Engineering in research, organization of conferences, review of scientific articles, work of Doctoral Councils. - Cooperation with Bulduri Horticultural Secondary School, implementing joint projects, mutual use of scientific infrastructure - Cooperation with other structural units of LLU in research, use of scientific equipment and laboratories (unified database of scientific equipment of LLU is available at https://www.llu.lv/lv/zinatniska-inventara-datubaze (only in Latvian)) 	<p>6.</p> <p>To regularly maintain co-operation with other Latvian higher education institutions, to promote the regularity of activities to be implemented within the framework of co-operation.</p>

<p>7. Research cooperation with the industry</p> <ul style="list-style-type: none"> - Cooperation with local governments and entrepreneurs, providing an opportunity to conduct research relevant to the field within the framework of study courses and final theses. - Cooperation with the industry for relevant research (within the framework of contract work), promoting the transfer of innovations into the national economy. 	<p>7.</p> <p>Implement regular meetings with the industry representatives, identifying relevant research areas for the industry and introducing the industry representatives to previously implemented research, available infrastructure.</p> <p>To prepare a list of research services and publish it on the LLU Internet resources, as well as to regularly introduce the industry to the topics of the research implemented by the LLU. Cooperation projects with municipalities and companies, offering a service, product or innovation and concluding contracts for their implementation.</p> <p>Commercialization of developed products and services, offering them to municipalities and companies.</p>
<p><i>Weaknesses</i></p>	<p><i>Planned actions to address weaknesses</i></p>
<p>1. Research succession, generational change</p> <ul style="list-style-type: none"> - The issue of generational change will become more and more topical, where a dangerous trend is the slowdown of specific scientific directions. The current situation is favorable, as there is a professorship with years of experience and young scientists who are ready to take over this experience and continue to enrich it. However, the low competitiveness of the remuneration of the academic staff members limits the opportunities to attract well-known professionals in the study process and research, does not motivate new academic staff members to continue their studies in doctoral studies and obtain a doctoral degree. 	<p>5.</p> <p>The issue of the academic staff member remuneration must be resolved at the state level. The internal support tools of LLU - the motivation system and the bonus for scientific work must be improved in order to simultaneously focus on increasing the quality of research.</p> <p>Gradual attraction of young scientists (doctors) to ensure the study process and conduct scientific research, support tools for motivating the existing academic staff members without a scientific degree to start their doctoral studies and obtain a scientific degree.</p> <p>Formation of scientific succession and development of science schools for separate research directions as a basis for recognition of sub-fields on the local and foreign level.</p>

<p>7. Outdoor infrastructure development opportunities</p> <ul style="list-style-type: none"> - Lack of territory for the establishment of outdoor laboratories for the implementation of the study process and scientific activity of the subfields of land management, landscape architecture and civil engineering. 	<p>7.</p> <p>For the development of outdoor laboratories, opportunities for cooperation with other LLU study programmes are sought, for example, the agricultural study direction, Bulduri Horticultural Secondary School, as well as purposefully analyzing opportunities to attract funding within projects and in cooperation with industry companies.</p> <p>To develop the study base in Valdeka Castle, acquiring a place for practical training next to the study rooms (park, experimental areas for planting and covering materials, outdoor design exposition areas).</p>
<i>Opportunities</i>	<i>Planned activities to use the opportunities</i>
<p>1. New thematic niches in the field of Architecture and Civil Engineering in higher education</p> <ul style="list-style-type: none"> - "Green economy", adaptation to climate change, digitization, social inclusion, etc. 	<p>1.</p> <p>In co-operation with the industry, work on research on topics relevant to the industry and transfer the results of these researches into the national economy.</p>
<p>2. Recognition of LLU in the industry</p> <ul style="list-style-type: none"> - Taking into account many years of experience in the implementation of the study direction programmes and the high level of knowledge of the graduates, the direction programmes, as well as the research is well recognized in the industry 	<p>2.</p> <p>To strengthen cooperation with the industry, to create joint activities for popularization of the industry, transfer of developed innovations into the industry</p>
<p>3. Available EU funds for projects and infrastructure</p> <ul style="list-style-type: none"> - The available funds must be used for the infrastructure development and research 	<p>3.</p> <p>To develop motivation tools for more active attraction of EU funds, purposefully planning the involvement of human resources in this process.</p>
<p>4. Opportunity to cooperate with other Latvian scientific institutions, use their scientific infrastructure</p> <ul style="list-style-type: none"> - Available unified 	
<i>Threats</i>	<i>Planned actions to prevent threats</i>

<p>1. Changes in science and research in Latvia</p> <p>- In recent years, there have been significant changes in legislation related to the implementation of higher education and research (e.g. new classification of disciplines, typology of universities, etc.)</p>	<p>1. Regular review of the doctoral study programmes (once a year) and, if necessary, updating in accordance with trends in higher education in Latvia and Europe</p>
<p>2. Low competitiveness of academic staff member remuneration compared to the industry</p> <p>- Insufficient funding for the remuneration of academic staff members and support staff, which endangers the retention of new specialists for the implementation of the study process and scientific activity.</p>	<p>2. An issue to be solved by the state. Develop and maintain existing support programmes for academic staff members (motivational and science grants for study and research).</p>
<p>3. Increasing competition between Latvian scientific institutions</p>	<p>5. To strengthen cooperation with other Latvian scientific institutions. Looking for opportunities for collaboration in interdisciplinary research.</p>

3. To **promote the internationalization and international recognition** of studies and research, to develop the Baltic-wide landscape architecture study and science centre in Valdeka castle, GIS Competence Centre and scientific laboratory in the VBF study building, to strengthen cooperation in studies and research with foreign higher education institutions in the fields of land management, civil engineering and geodesy, landscape architecture and planning;

<i>Strengths</i>	<i>Planned actions to exploit strengths</i>
<p>1. Recognition at a Baltic level</p> <p>- In some areas (landscape architecture, land management) one of the leaders in the Baltics</p>	<p>1. Development of Valdeka as an international centre of landscape architecture to implement both local and international activities in landscape architecture - seminars, conferences, courses, exhibitions, etc. The park near Valdeka Castle is a unique value and should be developed as an integral part of the international landscape architecture centre. Strengthening and development of the GIS Competence Centre in cooperation with foreign and local cooperation partners.</p>

<p>2. Many years of experience in cooperation with other foreign educational institutions, industry organizations and state institutions in organizing joint activities (project week, international summer schools)</p> <p>-Annual International Landscape Architecture Summer Schools, Civil Engineering Summer Schools, participation in the European Project Week for civil engineering students, international courses of the Baltic Agricultural Universities network (BOVA network), ERASMUS + mobility programme, international cooperation and research projects</p>	<p>2.</p> <p>To maintain and strengthen cooperation with local and foreign universities, branch organizations and state institutions, which would include both the involvement of guest lecturers and the possibility of training students in the participating universities. It is especially important to develop cooperation with higher education institutions, which offer study courses that are not implemented at LLU, but are closely related to the represented specialties and thus would be useful in teaching specific topics.</p> <p>To the extent possible, plan the involvement of the students in the activities of various international projects in connection with the study process.</p>
<p>3. International activities of the academic staff members, work in international branch organizations, good knowledge of English and Russian</p> <p>- Several academic staff members have good knowledge of English and Russian, which allows to organize various levels of international courses, attract ERASMUS + students, implement programmes in English.</p> <p>- Several academic staff members work in international branch organizations, cooperate with foreign partners in the implementation of international projects and other activities.</p> <p>- Opportunities to attract outstanding industry specialists from Latvia and Europe within the framework of VBF budget programme, ERASMUS +, BOVA, Swiss grant and other programmes</p> <p>- Cooperation with Russian educational and scientific institutions</p>	<p>3.</p> <p>Purposefully plan regular activities to attract foreign students (summer schools, cooperation within projects, etc.), which would also promote the international activity of local students.</p> <p>To strengthen cooperation with foreign partners, work on joint project applications, activities.</p> <p>Every year to plan the involvement of foreign visiting professors in the study process and research</p> <p>Strengthen and develop cooperation with Russian partners by purposefully planning regular activities (for example, student exchange programmes)</p>
<p>4. Mobility opportunities for academic staff members to lecture and gain experience within ERASMUS +, NordPlus and other programmes.</p>	<p>4.</p> <p>To promote the mobility of academic staff members for the formation of new cooperation partners and strengthening of existing cooperation.</p>

5. Study programmes in English (landscape architecture and planning, land management and surveying, civil engineering)	5. To popularize the offer of existing study programmes for attracting foreign students. To develop an engagement action plan and activities.
6. International scientific journals "Landscape Architecture and Art" (indexed by Scopus, WoS), "Baltic Surveying" published by the departments	6. To use scientific journals to promote and strengthen the recognition of the study direction, to attract new foreign cooperation partners.
Weaknesses	Planned actions to address weaknesses
1. Currently, there is still a relatively small interest in the programmes offered in the study direction in English - The first study programmes in English have been launched relatively recently - Insufficient marketing activities due to limited financial and human resources	1. To plan and implement marketing activities to attract foreign students. Development of new study programmes that would be of a more general in nature and less linked to the Latvian market and situation.
2. Insufficient information in English about the programmes offered on the websites of LLU and VBF	2. Supplement information in English on LLU and VBF websites
Opportunities	Planned activities to use the opportunities
1. Available programmes for the implementation of international activities and promotion of cooperation	1. Identify available programmes and motivate academic staff members to get involved in developing applications
Threats	Planned actions to prevent threats
1. Increasing competition in the European market in the implementation of study programmes, research and academic projects	1. To identify the unique and attractive aspects of the offered study programmes and activities and to use them in the promotion of international activities. Identify and offer activities outside the European market (for example, strengthen existing cooperation with St. Petersburg higher education institutions)

2. Threats posed by pandemics and other emergencies in the implementation of international activities	2. Develop alternative scenarios, action plans to change the forms of implementation of various international activities (video lectures, online consultations, seminars, etc.) in case of emergency.
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4. Ensure the quality of studies and research environment, student-oriented **management of the study direction** to promote learning.

Strengths	Planned actions to exploit strengths
1. Hierarchical levels of governance are clearly defined to address different issues - Each level of management has its own competencies in solving specific issues (for example, the director of the study programme primarily deals with issues related to the study process and students, the dean and vice-dean of the faculty deals with strategic issues that include both study, research and financial issues)	1. Prepare and strengthen the competence framework at the relevant levels and make it publicly available in order to improve the speed and quality of resolution of issues
2. Internal communication between the academic staff, management, students - Several tools have been developed to ensure internal communication and inform the employees (LLU information sheets for employees and students about current events of the week, working sessions at faculty and LLU management level, faculty and department level and internal level of each department, meeting with student self-government and each student course)	2. Further develop methods and tools to improve internal communication

<p>3. Creating feedback, availability of the academic staff members</p> <p>- Feedback is provided both within each study course, ensuring communication between academic staff members and students in the e-environment or in consultations; both in the form of surveys (for students after each session, graduates and employers - once a year)</p>	<p>3.</p> <p>Develop surveys for students, graduates and employers on the VBF website.</p> <p>Create and develop a FAQ section on study, research and management issues on the VBF website</p> <p>To improve the procedure for the availability of academic staff members, forms of communication (remote and face-to-face consultations, communication in the e-environment)</p>
<p>4. Examination and settlement of disputes</p> <p>- Different level commissions, Ethics Commission, Academic Arbitration Court</p>	<p>4.</p> <p>Once a year to inform students and employees about the possibilities and procedures for resolving disputes</p>
<p>5. Work, study and leisure infrastructure in the study building of Valdeka Castle</p> <p>- Renovated in 2015, Valdeka Castle includes a modern work, study and leisure infrastructure (there are leisure rooms for students and employees), which is available 24 hours a day, 7 days a week according to a pre-determined procedure.</p>	<p>5.</p> <p>To use the infrastructure of Valdeka Castle study building as an example of good practice for the development of study and work environment, to further develop the study and work environment of VBF study building and attracting additional funding</p>
<p>Weaknesses</p>	<p>Planned actions to address weaknesses</p>
<p>1. Support for the implementation of initiatives and ideas of the academic staff members within the available budget</p>	<p>1.</p> <p>Develop a format in which academic staff members can submit their ideas and initiatives to improve the study direction, scientific or management processes.</p>
<p>2. Improvements of work and study environment within the available budget</p>	<p>2.</p> <p>Continue work on attracting funding for improvements to the VBF study building (including work, study and leisure environment).</p>

3. Insufficient information on the VBF website, including information in English	3. Development of VBF website, including already existing information about the faculty and departments, portfolio of study programmes, information about various implemented and current activities, developed materials, database of academic staff and other information.
4. Insufficient publicity about the activities of the study direction on LLU, VBF websites and social media	4. Provide human resources to ensure communication on social media and update the information on the VBF website within the limits of the available budget.
Opportunities	Planned activities to use the opportunities
1. Various digital tools for better communication	1. Identify digital tools that would contribute to the improvement of the management system, including improved communication and feedback.
2. Cooperation with Latvian media, industry newspapers and Internet resources	2. Plan regular co-operation with the Latvian media in order to popularize the activities of the field.
Threats	Planned actions to prevent threats
1. General changes in the management system of higher education institutions in Latvia, changes in regulatory enactments	1. Regularly follow changes in regulatory enactments related to higher education. Further actions are within the competence of LLU management.

Currently, in accordance with the set general goals of the study direction Architecture and Civil Engineering, a 6-year development plan of the study direction has been developed, which includes the main actions for achieving the set goals, including the prevention of threats and weaknesses (Appendix 1). The development plan of the study direction is closely related to the development strategy of LLU and the common tendencies in education and industry, therefore it is updated every year. Currently, a new LLU strategy is being developed, which is also based on changes in the Law on Higher Education Institutions, the typology of higher education institutions and the introduction

of other important requirements.

Also, every year a work plan is prepared for achieving the indicators specified in the LLU development strategy in research, study and administration programmes, as well as for the implementation of actions specified in the study direction. The work plan for the current year, as well as the report on the implementation of the previous year's work plan is reviewed and approved by the VBF Board every year.

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 management of the study direction Architecture and Civil Engineering consists of several levels:

- the general management, administrative and support level of the LLU;
- the strategic level of the study direction;
- the action level of the study direction.

The levels of management and their main functions, as well as the structural units or leading staff involved in their implementation are summarized in *Table 1 of Appendix No. 2*. The table shows the responsibilities (directly responsible or supportive) of the structural units or leading staff involved in the implementation of the functions / activities of each management level.

Taking into account the implementation of programmes of the study direction under the responsibility of the Faculty of Environmental and Civil Engineering, **the strategic and action level of the study direction is closely related to the study, science and management processes at the VBF**. *Management structure of the study direction in the context of the Faculty of Environmental and Civil Engineering is provided in Figure 1 of the Appendix No.2.*

The planning of the development of the study direction takes place in close connection with the overall strategic goals and directions of LLU, in the development of which the deans of faculties also participate. The dean forms a strategic link between the study directions represented at the faculty and the strategic requirements for the overall development of LLU set by the LLU management, the involved services, the student self-government and the convention of advisers (industry representatives). Further, in accordance with the internal strategic and action levels of the study direction Architecture and Civil Engineering, the implementation of the direction is monitored and development planning is mainly carried out by the Dean of the Faculty of Environment and Civil Engineering, head of the study direction and directors of the study programmes. **The Dean of the VBF mainly performs administrative and strategic functions and oversees the development of the faculty as a whole**, including the study, research process, and economic activities, as well as management. Under the supervision of the Faculty of Environmental and Civil Engineering, two study directions are implemented. **The head of the study direction, in turn, sees the mutual points of contact and interdisciplinary development opportunities** of the fields represented by the specific study direction, and, together with the faculty management and the directors of the study programmes, it is possible to determine the strategic goals of the study

direction and the actions necessary to reach these goals. **More detailed solutions are within the competence of the director of each study programme.** The directors of the study programmes closely cooperate with the heads of the departments, who are responsible for administrative issues related to the development of the work, study and research environment and technical provision, attraction and provision of academic and auxiliary staff, funding and planning for various activities. The VBF management, the head of the study direction and the directors of the study programmes work on the annual report of the study field, as well as on the development of the self-assessment report, which is discussed in joint working sessions, involving students' self-government and industry representatives.

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.

Admission rules for all LLU study programmes are approved by the Senate in October every year and published on the LLU website. For those interested, the regulations in Latvian are available here <https://www.llu.lv/lv/uznemsana>, and regulations in English - here: <https://www.llu.lv/en/degree-programmes>.

New Bachelor's, Master's and doctoral students are admitted on a competitive basis in accordance with the competition criteria set out in the admission rules.

Admission rules for undergraduate studies (<https://www.llu.lv/lv/pamatstudijas#uznemsana> (in Latvian))

1st level professional higher education study programme Civil Engineering (<https://www.llu.lv/lv/pamatstudijas/buvnieciba-1-limena> (in Latvian)), professional Bachelor's study programme Civil Engineering ([https://www.llu.lv/lv/pamatstudijas / construction](https://www.llu.lv/lv/pamatstudijas/construction) (in Latvian)), the professional Bachelor's study programme Land Management and Land Surveying (<https://www.llu.lv/lv/pamatstudijas/zemes-iericiba-un-mernieciba> (in Latvian)) - **general secondary education or professional secondary education**. New students are admitted on a competitive basis based on the results of their centralized exams in Latvian, a foreign language (English, German, French or Russian), mathematics, physics. In the academic Bachelor's study programme Landscape Architecture and Planning (<https://www.llu.lv/lv/pamatstudijas/ainavu-arhitektura-un-planosana> In Latvian); https://www.llu.lv/en/landscape_architecture (For international students)), there is an additional mandatory requirement to pass an in-person entrance examination in Drawing. Entrance examination papers are evaluated by an evaluation commission specially created for this purpose from at least 3 academic staff members of the programme.

Applicants can apply for the study programme using the e-service (in the portal latvija.lv) and a unified admission system, in which applicants' applications are processed simultaneously by 12 Latvian universities (Latvia University of Life Sciences and Technologies, University of Latvia, Riga Technical University, Daugavpils University, Liepaja University, Vidzeme University College, Rezekne Academy of Technologies, Ventspils University College, BA School of Business and Finance, EKA University of Applied Sciences, RISEBA University of Applied Sciences, ISMA). 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 confirm 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.

As foreign students are also admitted to the professional Bachelor's study programme Land Management and Land Surveying, as well as to the academic Bachelor's study programme Landscape Architecture and Planning, the additional requirement for them is **English language skills at least at B2 level**. The procedure for admission of foreign students and submission of the necessary documents is described here <https://www.llu.lv/en/how-to-apply>.

Admission to undergraduate studies outside the competition

Outside the competition, full-time and part-time students are admitted if they have fulfilled the requirements of the above rules and:

- Have acquired, within the last three years, one of the first three places/ degrees of recognition at an international and Latvian study Olympiad or students' research competition that is recognized by the Ministry of Education and Science of the Republic of Latvia in physics, mathematics (only for the study programme "Civil Engineering" and the following branches/sections: Astronomy (only in the study programme "Civil Engineering"), Life Sciences, Engineering and Technology, Mathematics, Humanities and Arts (only in the study programme "Landscape Architecture and Planning"), Earth Sciences and the related environmental studies (only in the study programme "Land Management and Surveying");
- Regional student research conferences - winners of the competition, who have obtained an LLU certificate in Natural Sciences, Engineering and Technologies or Humanities and Arts section;
- Winners of the first three places in the classes and competitions for young builders and future surveyors organized by VBF, as confirmed by the faculty;
- Have received a confirmation from the technical / professional secondary school and LLU regarding the possibility to obtain a state-funded study place in the year of graduation of the technical / professional secondary school. A cooperation agreement has been concluded between the school and LLU on the possibility to admit the best graduates outside the competition.

Admission rules for Master's studies

Admission requirements for the professional Master's programme Civil Engineering (<https://www.llu.lv/lv/magistra-studijas/buvnieciba> (in Latvian) - **professional Bachelor's degree in civil engineering or professional qualification in construction (civil engineer)** obtained in study programmes, the duration of which in full-time studies is at least four years (160 CP).

The professional Master's programme Landscape Architecture and Planning ((<https://www.llu.lv/lv/magistra-studijas/ainavu-arhitektura-un-planosana> (in Latvian); <https://www.llu.lv/en/landscape-architecture> (for international students)) is the second consecutive programme for obtaining the qualification of a landscape architect, therefore the admission requirements are **academic or professional Bachelor's degree or second level higher professional education in landscape architecture**.

New Master's students are admitted on a competitive basis based on their weighted average mark obtained in their Bachelor's (or higher professional) studies. LLU graduates can apply for Master's

studies electronically using the LLU Information System, graduates of other higher education institutions must apply in person at LLU.

As foreign students are also admitted to the Master's study programme Landscape Architecture and Planning, the additional requirement for them is **English language skills at least at B2 level**. The procedure for admission of foreign students and submission of the necessary documents is described here <https://www.llu.lv/en/how-to-apply>.

Admission rules for doctoral studies

Admission requirements for the doctoral study programme Civil Engineering (<https://www.llu.lv/lv/doktora-studijas/buvzinatne> (in Latvian); <https://www.llu.lv/en/doctoral-study-programme-civil-engineering> (for international students)) - **Master's degree or equivalent higher education in civil engineering**. If the Master's degree has been obtained in another branch of science, an entrance examination may be required in the selected sub-branch of civil engineering.

Admission requirements for the doctoral study programme Landscape Architecture (<https://www.llu.lv/lv/doktora-studijas/ainavu-arhitektura> (in Latvian); <https://www.llu.lv/en/doctoral-study-programme-landscape-architecture> (for international students)) - **Master's degree or equivalent higher education in landscape architecture and architecture**. If the academic or professional Master's degree has been obtained in another field of science, the conformity of applicants with the study programme shall be evaluated by the director of the study programme, an entrance exam in landscape architecture may be required.

As both doctoral programs are also implemented in English, if a Master's degree is obtained at a foreign university, the opinion of the Latvian Academic Information Center is required. Foreign applicants need **English language skills at least at B2 level**. The procedure for admission of foreign students and submission of the necessary documents is described here <https://www.llu.lv/en/how-to-apply>.

Prospective students in the study programmes of the study direction can also **start studies in later stage**, if they have previously acquired knowledge, skills and competencies in formal education or in non-formal education. LLU has approved regulations and procedures for starting studies in later stage and for the **recognition of knowledge, skills and competencies** acquired outside formal education or professional experience.

A successful example is the 2nd level professional higher education study programme Civil Engineering (which will be replaced by part-time studies of the professional Bachelor's study programme Civil Engineering). The programme is designed so that it would be possible to start studies in the 4th year for those students who have graduated from the 1st level professional higher education study programme in civil engineering. Recognition of knowledge, skills and competences acquired through professional experience is often used by students already working in practice, who mainly study part-time. They have the opportunity to recognize their practical activities in industry companies and experience with professional practice in the 1st level professional higher education and professional bachelor study programs Civil Engineering. The procedure for recognition of knowledge, skills and competences acquired in professional experience is organized in cooperation with the Lifelong Learning Center of the Latvia University of Agriculture (<https://www.mc.llu.lv/pakalpojumi/pieredzes-atzisana> (only in Latvian), by establishing a special commission and in accordance with the procedures specified by the Latvia University of Agriculture and other regulatory enactments.

The opportunity to perform **academic recognition for previously acquired study courses** (LLU order on the procedure for academic recognition at LLU is attached in the Appendix 10) is also used

by students who had already studied before and now would like to enter studies at later stages. This opportunity is used by graduates of the 1st level professional higher education study program Civil Engineering, who have the opportunity to join the part-time professional bachelor study program Civil engineering, performing academic recognition for study courses acquired in previous education.

LLU VBF has concluded cooperation agreements with Rezekne Higher School of Technologies (RTA), Riga Construction College (RCK), Vidzeme University College (ViA) for such an opportunity. The LLU also implements the 1st level professional higher education program Civil Engineering, which allows graduates of this programme to join the professional Bachelor's study programme Civil Engineering (part-time) and obtain a civil engineer's qualification and a Bachelor's degree in engineering in a shorter time.

There are also situations when students have to stop studying for various reasons. After the break, it is possible to continue the studies, performing academic recognition for the previously acquired study courses, which correspond with the current study programme plan. Since 2013, a total of 116 students have renewed their studies (on average, 13 students per year). The largest number of students who have renewed their studies is observed in the undergraduate study programmes in Civil Engineering, which is related to the students' leaving studies due to failure or being unable to complete the study plan in time. These students acquire the missed study courses through the LLU Lifelong Learning Center as listeners. After successful completion of the study courses, students are renewed in the study programme.

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.

LLU students' success evaluation criteria, conditions and binding procedures are described in the Study Regulations, which are available in Latvian: <https://www.llu.lv/lv/studijas> and in English: <https://www.llu.lv/en/study-guide-documents>

Student evaluation criteria are defined in the description of each study course (available to students electronically), as well as each lecturer introduces students to the evaluation criteria when starting the specific study course. The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works. Extensive study courses in Landscape Architecture and Planning study programmes, in the implementation of which several academic staff members are involved, are evaluated by several lecturers, which eliminates subjectivity in evaluation. The theses are evaluated by a commission of at least 5 people.

Assessment methods and procedures are applied to the specific study courses and study program, as well as in individual cases, taking into account the differences in students' perceptions and particular situations. For example, the evaluation of project-based study courses takes place in the form of an individual discussion, together with the lecturer analyzing the positive aspects of the work and features should be improved, which the student must then carry out in order to obtain a final assessment. In turn, assessment methods in theoretical study courses will most often be in the form of written examinations or tests. Here, approaches can be varied depending on the situation or the student's perception. For example, during the COVID-19 pandemic, study work, including paper evaluation, had to be reorganized into an e-learning format. Evaluation of project-based

study courses and provision of feedback in the e-learning format is not able to ensure the appropriate quality of studies, therefore it can be provided only as full-time studies. Perceptions of the study material and work of a particular group of students are always assessed, which, for example, can influence the number of mid-term assessments.

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 - conducting academic work in accordance with the highest standards of professionalism and accuracy, objectivity and truthfulness, moral and ethical principles, honesty, including the prevention of plagiarism, truthful reporting and accuracy in academic publications, as well as in communication and publicity activities, representing the image of the academic environment.

Goal of the academic integrity of the university:

- to adhere to a high level of academic and scientific culture,
- to promote public confidence in the quality of education and the results of scientific research,
- to prevent and eliminate violations of the principles of academic integrity,
- to establish liability for unfair and unauthorized conduct.

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

LLU has developed and follows certain procedures for the examination of plagiarism in final theses, and course of action if such violations are identified:

- Rector's order - Procedures for submitting electronic copies of final theses and their verification in the plagiarism control system;
- Rector's order - Violations of academic integrity in final / doctoral theses.

In 2014, LLU concluded an agreement on the use of the inter-university unified computerized plagiarism control system (hereinafter - the System) and started the examination of all final theses for plagiarism in both undergraduate and Master's studies. Starting from 2017/2018, LLU ordered that the obligatory examination of plagiarism must also be performed for doctoral theses.

The procedure stipulates that if the System finds in the thesis a 10% match with the text with another work, then the LLU work is reviewed by the Faculty Methodological Commission / Sectoral Doctoral Council and decides on the presence or absence of plagiarism, before receiving explanations from the author and the supervisor. When suspicious work is found, the procedure provides for discussions with the authors of all works. In case the plagiarism is confirmed, the student is expelled from studies.

In the period from 2014 to 2019, 551 works of study direction Architecture and Civil Engineering were examined, none of which was recognized as plagiarism.

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 on study directions and study programmes is published on the website of the Latvia University of Life Sciences and Technologies **www.llu.lv**, including regarding current events in the respective study programmes, as well as basic information about each study programme. Detailed information (descriptions of study programmes) is available in the section: *Studies / Study programmes* -> <https://www.llu.lv/lv/studiju-programmas> and in the section *Come study / What to study? Study programme selection assistant* -> <https://www.llu.lv/lv/studiju-programmas>

Information in **English** about the study programmes is available on the English language site of the Latvia University of Life Sciences and Technologies: *Studies / Degree Studies / Degree Programmes* -> <https://www.llu.lv/en/degree-programmes>

All descriptions of study programmes can also be accessed through the home page of the Faculty of Environment and Civil Engineering of LLU: <http://www.vbf.llu.lv/lv> *Studies / Study opportunities* -> <http://www.vbf.llu.lv/lv/studiju-iespejas>

Information about study programmes is also available in **electronic informative materials** (booklets), incl. information about the study programme and feedback from graduates.

- Graduate studies: <https://www.llu.lv/sites/default/files/2019-02/LLU-pamatstudiju-buklets-2019-WEB.pdf>
- Master's studies: https://www.llu.lv/sites/default/files/2019-03/LLU-Magistra-studijas-2019-web_0.pdf

The **structural units responsible** for the compliance of the information available on the LLU website with the information available in the official registers:

- Study centre - for 1st level, undergraduate and Master's study programmes,
- Study centre - for doctoral study programmes,
- Centre for International Cooperation - for study programmes in English.

The information on the LLU website has been prepared in cooperation with the director of each study programme.

Information about LLU study programmes is also available on the portal **www.prakse.lv**: <https://www.prakse.lv/edu/profile/84/latvijas-lauksaimniecibas-universitate>

Person responsible for posting the information: Lifelong Learning Centre project manager Zane Zeltiņa.

Information about LLU study programmes is also available in the **National Database of Educational Opportunities** [www.niid.lv](http://niid.lv): http://niid.lv/niid_search?qy=Latvijas%20Lauksaimniec%C4%ABbas%20universit%C4%81te&level_1=7

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

- <https://www.llu.lv/lv/stnationaliska-mobilitate> - in Latvian

- <https://www.llu.lv/en/exchange-studies> - in English

LLU subscribes to study e-marketing sites:

- <https://www.masterstudies.com/universities/Latvia/LLU/>
- <https://www.educations.com/search/jelgava>

For foreign students

The LLU website provides comprehensive and detailed information to potential and existing full-time students from abroad:

- on the offer of LLU study programmes in English, see <http://www.llu.lv/en/degree-programmes>, where the description of each programme is described in detail, including the study plan, for example, https://www.llu.lv/en/landscape_architecture
- on the step-by-step admission process, see <http://www.llu.lv/en/how-to-apply>
- on immigration procedures, see <http://www.llu.lv/index.php/en/immigration>
- on study and living conditions, see <http://www.llu.lv/sites/default/files/2018-11/LLU-Celvedis-EN-2018-17.10.pdf> ;
<http://www.llu.lv/index.php/en/before-arrival> ;
<http://www.llu.lv/index.php/en/about-university-0> ;
- feedback from foreign students, - <http://www.llu.lv/en/student-testimonials-7>

The director of the study programme or the external relations coordinator of the faculty is responsible for the compliance of the content of the information posted on the websites or the changes in the official information, but the external communication coordinators of the LLU Centre for International Cooperation (SSC) are responsible for posting on these websites.

The LLU Centre for International Cooperation has prepared and published informative booklets "Erasmus+ Mobility Information Handbook" "Degree Studies", information sheets and other materials that are used to advertise study programmes and exchange studies in marketing events.

From 2014, it is also possible to find out about the activities of the study direction with the help of social networks. **Sub-sector pages created on Facebook** are actively used for information circulation:

LLU VBF Land Management <https://www.facebook.com/zigevbf> (196 followers)

LLU VBF Civil Engineering <https://www.facebook.com/buvnbf> (237 followers)

LLU VBF Landscape Architecture and Planning Facebook account <https://www.facebook.com/aaplif> has 744 followers, but Instagram account https://www.instagram.com/ainavu_arhitekti_llu/ - 174 followers

To ensure the **publicity** of the fields of the study field Architecture and Civil Engineering, articles, video stories and interviews created by journalists, cooperation partners and academic staff members are also published.

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.

In 2016, LLU achieved compliance with the “Investors in Excellence” standard. In December 2020, LLU was recertified for the second time and currently its operation is accredited according to this standard until December 2022. Within the framework of this initiative, LLU has developed a document “Description of the Quality Management System and Implementation Plan” (<https://www.llu.lv/index.php/en/mission-and-vision>), which also includes the basic principles of ensuring the internal quality of the study direction.

The goals of the study direction Architecture and Civil Engineering, based on the common goals and action programmes set out in the LLU development strategy, are aimed at **high-quality studies and further education opportunities, integration of studies and research, transfer of innovation into the national economy, scientific succession** in land management and geodesy, civil engineering, landscape architecture and planning , ensuring the **recognition and competitiveness** of the study direction and the programmes included in it. The goals of the study direction also include improvement of the quality of studies and research environment, student-oriented **management of the study direction** to promote learning. Subordinated to the strategic goals of the whole study direction, the goals of the study programmes and the results to be achieved are focused on the **training of professional specialists (practitioners and scientists) required in the field**, who are able to address current issues in the field and, at the same time, use their knowledge, competencies and skills to promote the prestige and recognition of the branch, the profession and LLU.

In order to achieve the set goals of the study direction and the study programmes, the following actions are performed in accordance with the common quality management system of LLU:

Ensuring the internal quality of the study direction in accordance with the 19 main processes defined in the Quality Management System of LLU (in 3 thematic groups) includes the following activities:

No.	The main processes defined in the Quality Management System of LLU	Activities for internal quality assurance
1.	Management processes:	
1.1.	Decision making, implementation and execution control	Decision-making related to the development of the study direction and programmes is ensured in a hierarchical order, involving various stakeholders . Initiatives for changes in study programmes or development of new study programmes are discussed at the meeting of the department supervising the specific study programme. If the changes also affect the work of the academic staff members of other departments, then the changes are also considered in these departments. The decision of the department meeting and all accompanying documents are further reviewed in the VBF Methodological Commission, in which all VBF department heads, deputy deans participate, other interested parties (students, industry representatives) are invited, if necessary. If clarifications are required, the documents are returned to the department for improvement. If the Methodological Commission supports the planned changes, then the issue is further considered and approved by the VBF Council. The procedure is confirmed in the LLU internal document “Regulations for the development of study programmes” https://www.llu.lv/sites/default/files/2019-03/Studiju_programmu_izstradasanas_noteikumi_2019.pdf (only in Latvian)

1.2.	Strategy development, updating and execution control	<p>The study direction is provided by the Faculty of Environmental and Civil Engineering, which in total implements two study directions. In accordance with the goals set in the LLU Development Strategy for 2015-2022, the Faculty of Environmental and Civil Engineering annually prepares a work plan for achieving these goals within the framework of its implemented study directions and programmes. The work plan for the current year and the report on the implementation of the previous year's work plan are developed in cooperation with the directors of study programmes, heads of departments, heads of study directions, students, and are reviewed and approved by the VBF Council. The procedure and deadlines for the development of the work plan and report are determined in the internal documents of LLU.</p> <p>In accordance with the LLU Development Strategy for 2015-2022, a development plan for the study direction Architecture and Civil Engineering for the next 6 years has also been developed. It will be updated in accordance with the new LLU Development Strategy.</p>
1.3.	Ensuring the management system improvement process	<p>For the control of the study direction management, study direction reports are developed every year, which are hierarchically reviewed and approved by the VBF Methodological Commission, VBF Council, LLU Study Council and Senate. Academic staff, study programme directors, head of study direction, dean and deputies participate in the preparation of reports. During the preparation of the reports, the improvements implemented during the year are identified, as well as the shortcomings that should be eliminated. The reports are freely available on the LLU website https://www.llu.lv/lv/studiju-virzieni-parskati-un-pasnovertejuma-zinojumi (only in Latvian)</p> <p>The procedure and deadlines for the preparation of reports are specified in the internal documents of LLU.</p>
1.4.	Ensuring internal control	<p>In order to ensure the internal control of the implementation of the study programmes, the students' surveys are evaluated every study year, which the students fill in after each semester for the study course acquired in the specific semester. The director of the study programme is responsible for reviewing the shortcomings and necessary improvements indicated in the surveys. Thus, the director of the study programme has the opportunity to participate in the classes of the academic staff members involved in the programme in order to ascertain the quality of the implemented study course. The director of the study programme also primarily communicates with the students' representatives and provides feedback on the progress of the specific issue and possible solutions.</p>
2.	Principal activity:	
2.1.	Provision of the basic study process	<p>The internal quality of studies implemented in the study direction is ensured by the following documents directly related to the study process (location of documents: https://www.llu.lv/index.php/en/study-guide-documents)</p>

2.2.	Provision of scientific research work	The internal quality of the scientific activity implemented in the study direction is ensured by the annual evaluation of the scientific work of the academic staff members in accordance with the data submitted by them , according to which the bonus for scientific work is also calculated and paid. Such a motivation system enables the academic staff members to be more actively involved in research, to use the findings obtained in research in the improvement of the content of the study courses, to involve students in research. According to the profile of the academic work, the academic staff members has the opportunity to perform both academic work with students and do research. It is also one of the conditions for applying for an elected position, such as a professor.
2.3.	Provision of distance learning process	Distance learning programmes are not offered in the study direction, however, in 2019-2021, the possibilities of using the e-environment (https://estudijas.llu.lv/) were significantly improved and improved in connection with the restrictions of the Covid 19 pandemic for full-time studies. Online tools have been developed, video lectures have been prepared, a wide base of study materials has been created. Also, when resuming full-time studies, it is planned to use certain tools for more adaptive implementation of the study programme (for example, consultations or video lectures, inviting foreign visiting professors; publication of study materials, tests, etc.). The evaluation of the quality of the e-environment is provided by the students of the programme together with the evaluation of the whole study course at the end of the specific semester. Also, the activity of the academic staff members in the e-learning environment together with other activities of the study process and qualification improvement is evaluated every year in accordance with the procedure established by LLU. According to the activities of the academic staff member, the motivational bonus to the salary is calculated.
2.4.	Ensuring the lifelong learning process	The study direction cooperates with the Lifelong Learning Center of LLU within the framework of various activities. These are both the lifelong learning courses (for example, "Garden and Landscape Architecture"), which involve academic staff members of the study direction, and cooperation for the recognition of non-formal education for students already working and experienced in the field (for example, the professional work in industry of the students of the 1st level professional higher education study programme Civil Engineering is recognized and equated to undergraduate internship). The activities of the academic staff members and participation in lifelong learning activities are evaluated every year in accordance with the procedure established by LLU. According to the activities of the academic staff member, the motivational bonus to the salary is calculated.

2.5.	Attracting, admitting and ensuring the study process of foreign students	<p>Attracting, admitting and organizing the study process of foreign students takes place in cooperation with the LLU Centre for International Cooperation, which has developed certain procedures for the implementation of these processes to ensure internal quality; these are available on the LLU website (https://www.llu.lv/en/degree-studies, https://www.llu.lv/en/exchange-studies).</p> <p>Within the study direction, the work with foreign students is organized with the help of the international coordinators of the faculties (for students of mobility programmes) and the directors of study programmes (for students of programmes offered in English).</p> <p>Foreign students fill in questionnaires about the study process, which are used to improve the study process.</p>
2.6.	Ensuring international cooperation	<p>Various international activities are implemented in the study direction: international cooperation projects, organized conferences and seminars, international summer schools, trainings within BOVA and other programmes. The academic staff members annually prepare a report on study and research activities, including international ones. After the evaluation of the submitted reports, motivation allowances are calculated and paid to the academic staff members. Such a motivation system promotes the international activity of the academic staff, which is essential for the development of the field of study.</p>
3.	Support processes:	
3.1.	Human resource management and development	<p>Human resource management and development planning, as well as the selection of appropriate staff (academic, research staff and teaching support staff) are essential to ensure the internal quality of the study direction. Therefore, a 6-year development plan for academic and scientific staff is being developed, which indicates the planned changes in the positions (growth opportunities according to vacancies, generational change, succession of thematic areas, need for new positions). Elections for positions (professor, associate professor, assistant professor, lecturer, leading researcher, research assistant) are planned according to the plan. However, the staff development plan is reviewed annually and, if necessary, updated according to the current situation. The staff development plan helps to ensure an even representation of the directions of study The staff development plan helps to ensure an even representation of the field of study and the levels of academic positions.</p> <p>Therefore, when a vacant academic position appears, the director of the study programme purposefully addresses the appropriate candidatures from among the branch or from doctoral students, taking into account the compliance of each candidate's professional or research field with the announced vacancy. The further personnel selection and management procedure is performed by the Human Resources Department of LLU in accordance with the regulatory documents of Latvia and LLU.</p> <p>Also, the director of the study programme in cooperation with head of department annually holds discussions with the academic staff members about the workload planned for the next study year in accordance with the work opportunities and needs of the lecturer, as well as taking into account the assessment of the quality of the lecturer's work in the previous study year.</p>

3.2.	Financial resource management	<p>The financial resources of the study direction are managed in two directions. One aspect consists of centrally administered funding (staff salaries, total LLU maintenance and administration expenses), which is planned and supervised by the LLU Financial Planning Centre in accordance with the LLU internal regulatory documents. The second part of the funding is planned within the VBF for the development and maintenance of the infrastructure necessary for the faculty, study direction and programmes, and for the implementation of the study and research process. In accordance with the funding available to the VBF, an estimate of revenue and expenditure is prepared each year, in which the items to be included are discussed and agreed with the heads of departments. The prepared estimate, as well as the financial utilization report for the previous year is reviewed and approved by the VBF Council, which ensures transparent management of financial resources.</p>
3.3.	Provision and maintenance of infrastructure	<p>The provision and maintenance of the infrastructure is implemented in two blocks. One is the centrally planned maintenance of the infrastructure, the other is the provision and maintenance of the specific infrastructure (laboratories, computer classrooms, etc.) required for specific study programmes. The planning and maintenance of the infrastructure necessary for the study direction and programmes takes place at the departmental level. Departments prepare and prioritize the necessary works and procurements for the development and maintenance of infrastructure. The Dean of the VBF conducts discussions with the heads of the departments in order to identify priority works that would need to be budgeted within the current year or in the coming years. According to the available funding, a procurement plan is prepared, which includes the infrastructure works to be implemented in the particular year. The procurement plan is coordinated by the Chancellor of LLU, if necessary, other services are involved. The further procurement process is organized and ensured by the Procurement Department of LLU in accordance with the internal regulatory documents of Latvia and LLU</p> <p>In recent years, significant infrastructure development has taken place through the implementation of several EU programme projects (for example, the development of the GIS Competence Centre, the Scientific Laboratory of Building Structures, etc.).</p>
3.4.	Document management	<p>LLU has established procedures for document management, it has developed internal normative documents, which are also observed in the context of study direction and programmes.</p>
3.5.	Examination of applications and complaints	<p>LLU has established procedures for reviewing applications and complaints (for more details, see <i>Subsection 1.2.3</i>). The review of applications and complaints in the context of programmes of the study direction takes place primarily at the level of the study programme director. If the issue cannot be resolved at this level, then it is considered by the VBF Methodological Commission, inviting the involved parties if necessary.</p>

3.6.	Provision of communication	<p>Provision of communication in the context of the study direction takes place in two directions - external and internal communication. External communication with the public in general is provided in cooperation with the LLU Communication and Marketing Centre, using LLU and VBF websites, social media and other media. It ensures the representation of a unified image and information of LLU to the public.</p> <p>Communication with partners and stakeholders is ensured according to the importance and topic of the issue, involving an employee of the appropriate level or area.</p> <p>Internal communication of the study direction is ensured within the department meetings and various working groups and commissions. Communication also takes place by e-mail; each LLU employee and student is provided with their own e-mail address. Communication within the study course is also provided in the e-learning environment.</p> <p>For information circulation, monthly LLU Newsletters have been created for the employees and students to learn the latest news (events and decisions).</p> <p>The culture of internal communication is regulated by the LLU Code of Ethics https://www.llu.lv/index.php/en/study-guide-documents</p>
3.7.	Maintenance and updating of the Fundamental Library	<p>The process of maintenance and updating of the Fundamental Library is supervised by the library staff. The resources of the Fundamental Library of LLU are described in more detail in <i>Section 1.3.3.</i> Every year, the Fundamental Library of LLU conducts surveys on the acquisition of literature necessary for the implementation of the programmes of the study direction. The necessary sources of information (books, magazines, databases, etc.) are compiled at the departmental level from the academic staff members involved in the implementation of the programmes.</p> <p>At the same time, two methodological classrooms are maintained by the VBF (in the VBF building and Valdeka Castle) to replenish the Fundamental Library collection - funding is allocated each year for the maintenance of the thematic library. Information about the books available for the programmes of the study direction in the Fundamental Library of LLU and in both methodological classrooms is published and available on the VBF website http://www.vbf.llu.lv/lv/informacijas-centrs (only in Latvian)</p>
3.8.	Ensuring the procurement process	<p>Procurement planning for the study direction takes place at the departmental level. Departments prepare and prioritize the necessary procurements. The Dean of the VBF conducts discussions with the heads of the departments in order to identify the necessary procurements that would need to be budgeted within the current year or in the coming years. According to the available funding, a procurement plan is prepared, which includes the procurements to be implemented in the particular year. The procurement plan is coordinated by the Chancellor of LLU, if necessary, other services are involved. The further procurement process is organized and ensured by the Procurement Department of LLU in accordance with the internal regulatory documents of Latvia and LLU</p>
3.9.	Provision of paid services	<p>The pricing of the paid services provided by any study direction or programme is negotiated by the order of the Rector in order to ensure the provision of transparent, fair competition-based paid services (e.g. rental of premises for educational events, copying, research services, etc.). The provision of the paid services is overseen by the LLU Director's Office and Chancellor's Office.</p>

Implementation of the internal quality assurance of the study direction in cooperation with the stakeholders:

Stakeholders	Role and tools in internal quality assurance
Existing students, prospective students, graduates	<p>Feedback from students and graduates is important for the evaluation of the study direction and the internal quality of the programmes. Surveys of prospective and current students and graduates are regularly conducted. The results are evaluated and taken into account for the improvement of programmes, as well as for the improvement of the study environment. Student representatives are included in the Council of the Faculty of Environment and Civil Engineering, in the LLU Study Council and LLU Senate.</p>
Employees	<p>Discussions and interviews with the employees involved in the implementation of the study direction (both academic staff members and support staff) mainly take place within the framework of the meetings of the department supervising the specific study programme. Meetings of the department are organized with a certain regularity, but not less than once in two weeks. At the meetings of the department, issues related to the quality of studies, the employee's work environment, opportunities for professional development and scientific work are considered. In some cases, if the employee is from another department, but the issue concerns the implementation of the study programme, then the employee is invited to participate in the meeting of the department. Matters related to employees are the responsibility of the head of the department and the director of the programme. In case of certain problematic issues, the dean of the faculty or the head of another structural unit may also take part in the discussions, if the employee is not from VBF.</p> <p>Employees are represented in the VBF Council, LLU Convention and Senate, as well as in various commissions directly involved in internal quality assurance.</p>

<p>Other educational institutions (secondary education, secondary professional and higher education institutions) both in Latvia and in the Baltic States</p>	<p>Regular exchange of experience and transfer of good practice from other educational institutions is essential for ensuring the internal quality of the study direction. Cooperation with other educational institutions is maintained both by mutually strengthening cooperation agreements, which include the implementation of joint activities, and the exchange of experience. The agreements concluded by the study direction with Riga Technical University on the transfer of the study programmes of the study direction, if it will not be possible to implement the specific programmes of the study direction, are very important. This requirement also complies with the regulatory framework for the implementation of programmes, which provides for the possibility to continue studies in another programme if the specific programme is no longer implemented.</p>
<p>Research institutes and other organizations involved in scientific activities</p>	<p>To ensure the internal quality of the study direction, there is an important scientific component that affects both the qualification of the academic staff (for example, the requirements set for the position of professor) and the status of LLU as a science university. Therefore, the performance of the academic staff in research is evaluated every year according to the indicators submitted by them. According to the submitted indicators, a bonus for scientific work is calculated for the academic staff member. Linking the findings gained in research with the study process, the involvement of students in research increases the quality of study programmes (especially in doctoral studies). In order to provide the research component, collaborations are established with other scientific institutions, which provide an opportunity to work in an interdisciplinary group and to use the scientific infrastructure of both parties.</p>
<p>Employers</p>	<p>In order to evaluate and ensure the internal quality of the study direction, employer surveys are regularly conducted, the results of which provide an opportunity to improve the study programmes in accordance with the demand of the industry. There are also regular meetings with employers in the field in connection with the provision of internships for students, co-operation in the implementation of guest lectures and study tours, co-operation in research projects.</p>

Industry experts and organizations	Discussions with industry experts take place within various industry commissions and working groups , in which the academic staff members involved in the study direction also participates (for example, work of the Education Section of the Latvian Union of Civil Engineers, seminars organized by the Latvian Association of Landscape Architects, work in the certification commission). The industry also initiates the development of professional standards in accordance with the Latvian regulatory framework, which are binding for changes or improvement of the content of the specific study programme. The quality of implementation of the requirements included in the professional standard in the specific study programme can be evaluated by industry experts by participating in theses commissions, as well as the programme evaluation (for example, within the ESF project No. 8.2.3.0/18/A/009 "Improvement of the Latvia University of Life Sciences and Technologies"). Thus, industry experts can provide their vision for the improvement of the study programme and the implementation of new initiatives.
State	The influence of the branch ministries on ensuring the internal quality of the study direction is related both to the development of professional standards and various regulatory documents of the field, as well as setting new requirements in the context of the specific industry in line with the latest trends in the industry. For example, in 2019, the Ministry of Economics together with industry organizations, other educational and scientific institutions concluded an agreement on the introduction of BIM in Latvia in the construction sector, including in education. This initiative determined changes in the content of study programmes and necessary improvements in the study infrastructure

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 at LLU takes place in accordance with the regulations "Regulations for the Development, Approval and Change of Study Programmes at LLU" approved by the Senate (Appendix No.16) The development of a new programme is led by a potential study

programme director. The regulations stipulate that before the study programme is approved by the Senate, it is discussed and analyzed in the Methodological Commission of the Faculty, the Council and the Study Council of LLU. Documents related to the studies and study programmes available: <https://www.llu.lv/lv/ar-studijam-saistitie-dokumenti> (in Latvian; <https://www.llu.lv/en/study-guide-documents> (in English)).

Existing study programmes are regularly reviewed every study year, as a result of which an annual report of the study direction is prepared. The directors of the study programmes participate in the development of **the annual report of the study direction**, the process is lead by the head of the direction. The reports are analyzed by the Faculty Council, the Study Centre, the Study Council and approved by the Senate. The reports are available on the LLU website <https://www.llu.lv/lv/studiju-virzientu-parskati-un-pasnovertejuma-zinojumi> (in Latvian).

In order to review and improve the study programmes, the findings expressed of the surveys of employers, students and graduates are evaluated. Also, in the implementation of study programmes there is regular communication with the representatives of the field, who are involved in the study process as invited guest lecturers, provide internships, welcome students in their companies during study tours, participate in thesis commissions. Also, the representatives of the industry, together with the academic staff members of the study direction participate in various industry commissions and working groups. During the cooperation, the latest trends in the field and the necessary improvements in the content of study programmes are highlighted. In the period from 2018 to 2021, all study programmes are evaluated in detail within the framework of the LLU project "Improvement of the Management of the Latvia University of Life Sciences and Technologies". Foreign experts and representatives of the respective industry (employers) participate in the evaluation of the programmes. Based on the recommendations of the experts, study programme improvement plans will be developed and implemented, which in turn will be included in the development plan of the entire study direction Architecture and Civil Engineering.

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.

During their studies, students have the opportunity and the right to submit proposals and complaints about the study process and related matters. Students can submit proposals:

- in writing or orally at the faculty level - to the curator, director of the study programme, vice-dean or dean;
- in writing or orally at the management level of LLU - at the Study Centre, to the Vice-Rector for Studies, the Study Council and the Senate, reviewing and approving various internal normative documents.
- anonymously, using the Whistleblowing option at LLU website: <https://www.llu.lv/lv/trauksmes-celsana>(in Latvian)

The LLU Study Regulations, which are available to all students at My LLU, determine the procedure for submitting and reviewing complaints.

If a student has submitted a written complaint, then after reviewing it, they will receive a written response if the review of the complaint has taken place without the student's presence.

The student can also submit a complaint to the Arbitration Court of LLU, which operates in accordance with its regulations.

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 in different cross-section and with different regularity.

Once a month:

1. Number of students by study programme, types and forms of studies, study directions and faculties - the collected statistics are sent to the management of LLU and deans of faculties. Statistical data is used to follow the dynamics of the number of students at LLU.
2. Fulfillment of state-funded study places - data is collected by study programme in order to follow the fulfillment of state-funded study places. These statistical data is used to forecast the number of new state-funded study places and the number of places available for student rotation in each semester (competition for state-funded study places) - the collected statistics are sent to LLU management and deans of faculties, vice-deans of faculties as needed.

Once every academic year:

1. Number of graduates by study programme, study directions and faculties, types of financing - data is used for preparation of various reports (for example, LLU annual report <https://www.llu.lv/lv/llu-pamatdokumenti>)
2. Admission results - admission results in different cross-sections. Admission results are used to plan admission limits and forecasts for each subsequent year.
3. LLU Statistical Data Collection *University-1* for the Central Statistical Bureau (CSB) Data collection is based on the forms specified by the CSB. The collected data is also sent to the Ministry of Education and Science and is available to all interested parties (<https://izm.gov.lv/lv/publikacijas-un-statistika/statistika-par-izglitibu/statistika-par-augstako-izglitibu> (in Latvian). The data is also used for the preparation of various reports (for example, the annual report of LLU).

Once a year:

1. Summary of statistics by study direction - the summary is made for the previous study year - number of students by study programme, types and forms of studies, graduates, dropouts and reasons for termination of studies, statistics of foreign students. These summaries are received by all directors of study programmes and the data is used for the preparation of annual reports of study directions for evaluation (available at <https://www.llu.lv/index.php/en/study-guide-documents>).
2. Fulfillment of state-funded study places by year - data is used for preparation of LLU, MoA and MES contract execution reports.

LLU Development Strategies 2015-2020. Summary of the performance indicators of the educational programmes - the data is used for the annual reports on the implementation of the Development

Strategy and for the cascading of the performance indicators for the next year. Strategy implementation reports by faculties take place in face-to-face meetings.

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.

All standards included in Part 1 of the ESG are integrated in the implementation of the study direction Architecture and Civil Engineering. The characteristics and evaluation of integration are explained in *Table 1*.

Table 1

Integration of standards included in Part 1 of the ESG in the implementation of study direction

No.	Standards included in Part 1 of the ESG	Characterization and evaluation of integration of the standard
1.1.	Quality assurance policy <i>"Higher education institutions / colleges must have a quality assurance policy. It must be made public and be part of strategic management. Policies need to be developed and implemented by internal stakeholders through appropriate structures and procedures and with the involvement of external stakeholders."</i>	LLU, as a whole, is currently on the way to developing a clear quality assurance policy, as evidenced by the compliance with the "Investors in Excellence" standard obtained in 2016. The activities of LLU are accredited in accordance with this standard until December 2022. Within the framework of this initiative, LLU has developed a document " Description of the Quality Management System and Implementation Plan " (https://www.llu.lv/index.php/en/mission-and-vision), which forms the quality assurance framework by setting out the main principles and activities. 19 main processes have been defined in the LLU Quality Management System, each of which determines the measurements of its operational efficiency, as well as the sources of data and information for performing measurements. The next step is to develop an explanation of key processes in an easy-to-understand and simplified format that would allow for more effective implementation of quality assurance processes at all levels, up to the individual employee or student.

1.2.	<p>Programme development and approval</p> <p><i>"Higher education institutions / colleges must have procedures for the development and approval of study programmes. Programmes must be designed in such a way that they meet their objectives, including the expected learning outcomes."</i></p>	<p>The standard is implemented in good quality. LLU has developed certain procedures for the development and approval of programmes. All documents related to studies are available here: https://www.llu.lv/index.php/en/study-guide-documents</p> <p>The development of programmes takes place in close cooperation with the stakeholders and the industry, which initially initiates the creation of certain new professions to be acquired, as well as the improvement of existing ones. There is a Council of Construction Industry Experts in Latvia, which in recent years has been working on the development of the Construction Industry Occupational Map, including the professions required in that industry and the related education levels and programmes.</p> <p>The content of the programmes of the study direction Architecture and Civil Engineering is developed in accordance with the LLU strategic specialization direction in bioeconomy and is updated in accordance with the industry trends and market demand.</p>
1.3.	<p>Student-centered learning, teaching and assessment</p> <p><i>"Higher education institutions / colleges should ensure that programmes are implemented in a way that encourages students to become actively involved in the learning process and that the assessment of student achievement is consistent with this approach."</i></p>	<p>The standard is integrated in good quality. The following student-centered learning, teaching and assessment approaches are taken into account in the implementation of the study programmes of the direction: individual approach, organizing practical work in relatively small groups; diverse approaches to training (group work, individual work, study tours, guest lectures, online lectures, etc.) and providing feedback on the assessments; opportunities for students to provide proposals for the improvement of the study process and study environment in regular communication with the directors of study programmes or in cooperation with the VBF Student Self-Government, which is also represented in the VBF Council and the LLU Convention.</p>

1.4.	<p>Student matriculation, study process, recognition and certification of qualifications</p> <p><i>"Higher education institutions / colleges must consistently apply pre-defined and published rules that describe the student's entire "study life", e.g. student enrollment, course of study, recognition and certification of his / her qualifications".</i></p>	<p>The standard is integrated in good quality. All information about studies at LLU is available and clearly accessible on the website of LLU and VBF, including binding normative documents</p> <p>In Latvian https://www.llu.lv/lv/nac-studet-llu In English https://www.llu.lv/en/studies</p>
1.5.	<p>Academic staff members</p> <p><i>"Higher education institutions / colleges must ensure the competence of their academic staff members. Procedures for the recruitment of academic staff members and the development of staff must be fair and transparent."</i></p>	<p>The standard is integrated in good quality. Taking into account the low competitiveness of academic staff salaries in comparison with the industry, in recent years LLU has been working on various support tools to motivate academic staff members to improve their competencies and become a part of the academic staff of the university. Bonus systems have been developed in accordance with the activities implemented by each academic staff member in study work and research, for which they submit annual reports. Attracting funding from EU programmes, several projects "Improvement of LLU academic staff" and "Improvement of the Management of the Latvia University of Life Sciences and Technologies" have been implemented, within the framework of which lecturers improved their competencies and knowledge in various training courses, as well as in internships in companies. Also, every year the professional improvement and mobility to foreign universities of the academic staff members is planned within the VBF funding (tuition fees).</p> <p>The recruitment of academic staff members for elected positions takes place on a competitive basis. Information about the competition for the specific vacancy is open and freely available, which provides an opportunity for any candidate to apply for the position. However, in order to ensure the attraction of high-quality and knowledgeable academic staff to the field of study, the director of the study programme addresses well-known professionals in the field, as well as doctoral students, personally informing them about the vacancy and opportunities to apply for it.</p>

1.6.	<p>Learning resources and student support</p> <p><i>"Higher education institutions / colleges must have adequate funding to provide learning and teaching activities and to guarantee an adequate and easily accessible range of learning resources and student support."</i></p>	<p>The standard is integrated according to financial possibilities. Taking into account the total funding for higher education in Latvia, which is low compared to other fields, the provision of study resources is largely based on the attracted funding from EU funds or other programmes, and industry support. In recent years, attracting funding from ERDF projects "Strengthening the research, development infrastructure and institutional capacity of LLU and scientific institutions under its supervision" (No. 1.1.1.4./17/I/003) and "Modernization of STEM study programmes" (No.8.1.1.0 / 17 / I / 001) provided significant teaching resources and development of high-quality study and scientific infrastructure (for example, high-performance computer classrooms, unique laboratories (acoustics, geodetic instruments calibration laboratories etc.). Also, for example, within the framework of the Latvian-Lithuanian cross-border cooperation project, a GIS Competence Centre has been established and equipped.</p> <p>LUA students have access to various support centres, as well as significant support is provided by the Student Self-Government. For the financial support of students, negotiations are constantly taking place with the industry, which has promoted the development of several scholarships for students in the study direction (for example, SIA PERI, SIA Itera Latvija, SIA UPB and other scholarships).</p>
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1.7.	<p>Information management</p> <p><i>“Universities / colleges need to collect, analyze and use the information they need for effective programme management and other activities.”</i></p>	<p>The standard is integrated in good quality, but could be improved. Currently, information is collected in various ways (statistical data on students, dropouts, etc., more detailed information in <i>Section 1.2.4</i>), but the collection of information from surveys of students, graduates and employers needs to be improved. Work needs to continue to ensure a larger number of respondents. The collected information is used in programme management, for example, when planning the distribution of state-funded study places in the programmes and by student courses according to the current situation. Failure and dropout rates are also monitored, identifying problematic situations that cause it (for example, in the 1st year dropout due to non-acquisition of science study courses. As a result, there is currently an opportunity to take a course in secondary school physics and mathematics, in addition to studies that ensure better integration of new students into the study programmes).</p> <p>For information circulation, monthly LLU Newsletters have been created for the employees and students.</p>
1.8.	<p>Public information</p> <p><i>“Higher education institutions / colleges should regularly publish clear, accurate, objective, up-to-date and easily accessible information about their activities, including the programmes offered.”</i></p>	<p>The standard is integrated in good quality. The public is informed in various ways - clear information on the LLU and VBF website, in various published materials, social media and other media. Detailed information in <i>Section 1.1.8</i>.</p>

1.9.	<p>Inspection and regular review of programmes</p> <p><i>“Higher education institutions / colleges should continuously review and periodically evaluate their programmes to ensure that the goals set are being met and that they meet the needs of students and the society. The review ensures continuous improvement of the programmes. All parties involved must be informed of any measures planned or taken.”</i></p>	<p>The standard is integrated in good quality. The programmes of the study direction Architecture and Civil Engineering are regularly reviewed (annual reports of the directions of study are prepared and evaluated, industry and foreign experts are involved in the evaluation of study programmes) and updated in accordance with the industry trends and market demand.</p> <p>In order to review and improve the study programmes, the findings expressed of the surveys of employers, students and graduates are evaluated. Also, in the implementation of study programmes there is regular communication with the representatives of the field, who are involved in the study process as invited guest lecturers, provide internships, welcome students in their companies during study tours, participate in thesis commissions. Also, the representatives of the industry, together with the academic staff members of the study direction participate in various industry commissions and working groups. During the cooperation, the latest trends in the field and the necessary improvements in the content of study programmes are highlighted. In the period from 2018 to 2021, all study programmes are evaluated in detail within the framework of the LLU project “Improvement of the Management of the Latvia University of Life Sciences and Technologies”. Foreign experts and representatives of the respective industry (employers) participate in the evaluation of the programmes. Based on the recommendations of the experts, study programme improvement plans will be developed and implemented, which in turn will be included in the development plan of the entire study direction Architecture and Civil Engineering.</p>
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In general, evaluating the integration of the standards included in Part 1 of the ESG in the implementation of the study direction Architecture and Civil Engineering, it must be concluded that the greatest challenges are related to *information management (1.7)*, which in turn is closely related to internal *quality assurance policy (1.1.)*. This is due to the large number of people involved, which in turn forms a complex staff management and information structure. The compliance of the Latvia University of Agriculture with the “Investors in Excellence” standard is an important step in the improvement of the internal quality management and information system.

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.

The **total funding** of the programmes of the study direction consists of:

- State funding in accordance with the 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) on the amount of state-funded study places in the programmes of the study direction.
- VBF's own funding (tuition fees and other income, such as rent for premises, research or study services, etc.).
- Scientific base funding granted to VBF according to the intensity and quality of research work.

The **number of state-funded study places** in each programme is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite agreement on financing for **2021** stipulates that **the base costs of one study place are 1630.11 EUR**. Further costs are determined by the coefficient of the study level (Bachelor's, Master's or doctoral), the social security of the study place corresponding to each study level and the cost coefficient of the thematic area. The coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers "Procedures for financing higher education institutions and colleges from the state budget". Additional available funding consists of tuition fee revenues. Every year the tuition fee is reviewed according to the economic situation in Latvia and approved by the order of the Rector of LLU.

Table 2

Available funding per study place per year (2021)

Programme	According to the tripartite agreement between MES, MoA, LLU				Tuition fee for Latvian students / foreign students per study year
	Study level coefficient *	Social security of the study place in EUR	Study cost coefficient of the thematic area	Costs per student EUR	
First level professional higher education study programme Civil Engineering					1400 NL
Professional bachelor`s study programme Civil Engineering	1	164.34	1.7	2935.52	2200 PL, 1400NL

Professional master`s study programme Civil Engineering	1.5	164.34	1.7	4321.13	2400
PhD study programme Civil Engineering	3	1009.53	1.85	10043.88	2620 / 4000
Professional bachelor`s study programme Land Surveying and Management	1	164.34	3.1	5217.66	1960 PL, 1400NL / -
Academic bachelor`s study programme Landscape Architecture and Planning	1	164.34	3.1	5217.66	2600 / 4000
Professional master`s study programme Landscape Architecture and Planning	1.5	164.34	3.1	7744.32	2800 / 4000
PhD study programme Landscape Architecture	3	1009.53	3.37	17483.75	3000 / 5000

* PL - full time, NL - part time

** - programmes are implemented or will be implemented in English

Every year, **the LLU Senate approves the distribution of revenues and expenditures of the general budget structure** of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

The remaining funding from tuition fees and other paid income, as well as the scientific base funding allocated to the faculty is used for the implementation of research activities, including publicity of research results in conferences and scientific journals, as well as for creative and other activities (e.g. student plein airs, thematic schools for prospective students, etc.).

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 study programmes of the study direction Architecture and Civil Engineering are mainly implemented by the Faculty of Environment and Civil Engineering (VBF) of LLU, however, the resources of other faculties as well as the centralized resources of LLU, such as the LLU Fundamental Library, are used to provide separate study courses. Classes are also held at the premises of the Faculty of Technology, Faculty of Agriculture, Faculty of Information Technology, Forest Faculty, Faculty of Food Technology, Faculty of Economics and Social Development.

As VBF provides the specific infrastructure and material and technical base of the study direction, the infrastructure available in VBF is described in more detail below, as it is located in the **main building of VBF** (Civil Engineering and Land Management and Surveying sub-directions) and the **Valdeka Castle study building** (Landscape Architecture and Planning).

During the reporting period, the study and science infrastructure in the study direction Architecture and Civil Engineering was significantly improved by attracting funding from the earnings of the Faculty of Environment and Civil Engineering (tuition fees, etc.), ERDF projects “Strengthening research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions” (No. 1.1.1.4./17/I/003) and “Modernization of STEM study programmes” (No.8.1.1.0 / 17 / I / 001), as well as from various other projects implemented at the faculty. Significant repairs have been made to improve classrooms and laboratories; high-performance computer equipment has been purchased that supports the development of digital skills, including BIM; as well as acquisitions of equipment, tools and furnishing have been made. Within the framework of the ERDF project “Modernization of LLU study infrastructure” implemented by LLU in the academic year of 2013/2014, **the accessibility of the environment** was improved by rebuilding the entrance part of the faculty, replacing the entrance door with automatic door, replacing one elevator with an elevator meeting the requirements of environmental accessibility, as well as utility rooms on the first floor of the faculty were rebuilt.

The use of **auditoriums** at LLU is planned centrally and the study process of the study direction is implemented in all 20 auditoriums of VBF and 7 auditoriums of Valdeka Castle. However, taking into account the specifics of the sub-fields and the specific visual aids required in the study process, most classes are implemented in the premises of the departments responsible for the implementation of the sub-field. The land management sub-direction is implemented by the Department of Land Management and Geodesy, the civil engineering and construction sub-directions are implemented by the Department of Architecture and Civil Engineering, the landscape architecture sub-directions are implemented by the Department of Landscape Architecture and Planning (at Valdeka Castle). The auditoriums are equipped with interactive displays or whiteboards, which provide an opportunity for the teaching staff to explain the study material and tasks in a more versatile and interactive way, and for the students - to present their study works. The auditoriums are equipped with internet access. Free wifi access for students and academic staff members is available in both buildings of the faculty. Internet is also available to participants of short-term seminars, guest lectures and conferences. **In the Professor Bušmanis' auditorium** (number of seats 220) it is possible to show educational films, organize conferences and thematic seminars.

In general, the following study and scientific laboratories, computer classrooms and other

infrastructure is used in the implementation of the programmes of the study direction (Table 3).

Table 3

Infrastructure used in implementation of the programmes of the study direction

Infrastructure and logistical support	B(1.)	B(b.)	B(m.)	B(d.)	ZIM(b.)	AAP(b.)	AAP(m.)	AAP(d.)	Other programmes	Schools	VBF schools	Other researchers
Building materials training laboratory for research of the composition and properties of building materials	x	x	x						x	x	x	
Building Materials Scientific Laboratory for in-depth testing of various materials and building materials		x	x	x								x
Acoustics laboratory for testing the environment and samples of various materials from the acoustic point of view. Acoustic measurement chamber for sound insulation and absorption testing of large samples and impact sound measurements.			x	x								x
Laboratory of construction physics for teaching and scientific work in the field of construction physics. Glass impact test bench, glass thickness and coating tester	x	x	x	x								x
Building construction scientific and training laboratories. Testing of various materials and building construction models under compression, tensile and yield loads.	x	x	x	x						x	x	x
Soil mechanics training laboratory	x	x	x									
The pump laboratory and the hydraulic modeling laboratory is equipped with a water flow-trough, which can be adapted to various laboratory and scientific research works.	x	x	x						x	x	x	
Water supply and sewerage laboratory with visual aids for teaching: pumps, oxygen meter, oximeter, fittings of various materials, year of manufacture and types, pipes and fittings, etc.	x	x							x	x	x	
Surveying training laboratory with modern measuring instruments	x	x			x	x			x	x	x	
Photogrammetry laboratory					x				x			
GIS Competency Centre with 12 workstations equipped with ArcGIS Pro software, various remote sensing tools.		x	x	x	x	x	x	x	x	x	x	x
Geodetic instruments calibration laboratory				x	x				x			x
Spatial modelling laboratory has 25 high-performance workstations equipped with software designed for landscape research and analysis of the obtained data, as well as for the development of 3D territory development models (ArcGIS Pro, Photoshop, SkechUp, AutoCad, Revit, Lumion).						x	x	x	x	x		x
Geospatial modelling computer classroom with 20 workstations equipped with software for spatial planning and research (Microstation, ArcGIS Pro, etc.)		x	x		x	x			x	x	x	
BIM computer classroom in 803 with 24 and in room 702 with 21 high performance computers equipped with BIM support software (AutoCAD, Revit, Microsoft Project, ArcGIS, ArcMap, Mathcad, PHPP, Saoundplan, Dluat RFEM and Axis VM, IDEA StatiCa Steel, Tecla Structures, SEMA)	x	x	x	x					x	x	x	x
Drawing rooms (in VBF and Valdeka study buildings), which can also be used as auditoriums and seminar rooms	x	x				x				x	x	

B(1.)- first level professional higher education study programme Civil Engineering

B(b.) - professional bachelor`s study programme Civil Engineering

B(m.) - professional master`s study programme Civil Engineering

B(d.) - PhD study programme Civil Engineering

ZIM(b.) - professional bachelor`s study programme Land Surveying and Management

AAP(b.) - academic bachelor`s study programme Landscape Architecture and Planning

AAP(m.) - professional bachelor`s study programme Landscape Architecture and Planning

AAP(d.) – PhD study programme Landscape Architecture

Other programmes - Study programmes of other study directions organized by the Lifelong Learning Center of LLU.

Schools - Partner secondary schools and technical schools (laboratory works, thematic classes)

VBF schools - VBF annual schools "School of young construction managers, construction supervisors and designers" and "School of young land developers and surveyors"

Other researchers - scientists from other structural units of LLU or other Latvian and foreign universities

More detailed information about the *infrastructure and material and technical provision of each study programme is included in Part 3 of the report regarding each programme.*

For specific research, LLU researchers and doctoral students have access to scientific laboratories and equipment also in other structural units of LLU, by prior agreement. Information on available scientific equipment at LLU is compiled in a single database and is freely available at <https://www.llu.lv/lv/zinatniska-inventara-datubaze> (only in Latvian)

The existing **infrastructure is actively used in cooperation with the industry representatives**, thematic seminars and conferences are organized jointly to present topical issues of the industry to industry professionals, students and other interested parties, contract research is performed for needs of industry companies to develop new materials or technologies. The infrastructure is also used to **attract new students** by organizing various training schools for young professionals, cooperating with vocational secondary schools and technical schools, and working with school students in laboratory work. **In cooperation with other Latvian and foreign higher education institutions**, researchers of LLU and other higher education institutions mutually use the research infrastructure, taking into account the specific directions developed in each higher education institution.

Future plans in the development of infrastructure are related to the development of **outdoor laboratories** in all sub-directions (landscape architecture, land management and surveying, civil engineering), which would allow more efficient and practical implementation of various practical works, outdoor research. For example, to test rain garden and green roof solutions, to study the effectiveness of various solutions for building enclosures, etc. The development of such laboratories is also possible in cooperation with other structural units of the Latvia University of Life Sciences and Technologies, for example, the Faculty of Agriculture (in the field of horticulture), Bulduri Horticultural Secondary School (in the field of ornamental plants), the Forest Faculty (use of timber in construction).

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.

The **study and scientific literature** required for the implementation of the programmes of the study direction Architecture and Civil Engineering is available in the Fundamental Library of LLU, as well as in the VBF Information Centre and the Methodical Classroom of Valdeka Castle.

Suitability of the working time of the Fundamental Library of LLU for the needs of students

The working hours of the library are adjusted to the needs of the main users of the library - students and academic staff. On weekdays, the library is open to users from 8.30 to 19.00, on Fridays - from 8.30 to 17.00. The library is also open to users on the first Saturday of each month from 9.00 to 14.00. The working hours of the library reading rooms and the Reference and Information Centre are extended until midnight during individual study and examination period. The catalog and online databases are available indefinitely 24/7.

Table 4

Information about the service premises at the Fundamental Library of LLU

Room No.	Name	Area, m²
161.	Subscriptions	26,9
254.	Reading room	396
	Reading room balcony	223
255-1.	Quiet reading room	34,3
255.	Inquiry and information center	57,6
76.	Study literature subscription	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 also has a seating area with comfortable sofas. There is also the quiet reading room available. The reference and information centre has desktop computers and the services of a qualified consultant are provided.

Services offered by the library

The following **free services** are available at LLU FB:

- use of a computer with internet connection and wireless internet,
- possibilities to use *Autodesk EDU Master suite 2018 (AutoCAD, AutoCAD Structural Detailing, Autodesk Robot Structural Analysis professional, etc.)*, *CorelDRAW X7*, *SPSS Statistics v21*, *VISIO 2013*,
- 24/7 use of online databases created, subscribed by the library or free of charge,
- submitting / receiving books, serials and other documents,
- training in working with full-text and bibliographic databases, consultations in working with computers and the Internet,
- training for the academic staff members of LLU, including online training on search, retrieval of information online, creating personal account, adding publications to the LLU academic

staff and researcher publication database, creation of the LLU IS personal account, Mendeley, researcher identification number ORCID and Research ID etc.,

- training for doctoral students, Master's students, undergraduate students, incl. in English,
- support materials for each target audience (scientists, students, other users) and provision of such materials on request,
- conducting inquiries and consultations on the library and its possibilities of use,
- editing bibliographies, sending examples of descriptions by e-mail upon request,
- creation of exhibitions according to additional agreement.

The following **paid services** are available at LLU FB:

- copying (color, black and white),
- prints (color, black and white),
- scanning,
- preparation of written thematic references,
- SBA and SSBA services (postal costs to be covered),
- delivery of copies of documents (according to suppliers' pricing),
- spiral binding.

The library offers the following **e-services** :

- 24/7 use of electronic catalog,
- 24/7 electronic book reservation, extension,
- use of *PRIMO DISCOVERY* unified search engine,
- 24/7 use of the library's online, subscribed and free online databases (both full-text and bibliographic), the possibility to use the "Ask the Librarian" service in the *EBSCO* database,
- possibilities to connect to the subscribed 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 search engine,
 - opportunities to use other online information resources from the library's website,
 - opportunities to connect from the library's website to the electronic catalogs of the information centres and information rooms of LLU faculties (BIS *ALEPH500*),
 - opportunities to use information resources and support materials prepared both by LLU FB and offered by database maintainers, accessing from the library website,
- electronic delivery of documents,
- "Skype a librarian",
- "Book request form" on the library's website.

Available databases in the relevant field, statistics of their use

The Fundamental Library of LLU offers users various online databases and databases on other media. The library has purchased the search engine *PRIMO DISCOVERY*, which provides simultaneous search in subscribed and open access online databases, in the electronic Joint Catalog of libraries of national significance, in databases created by LLU FB (publications of LLU lecturers and researchers, LLU Master's theses, etc.). By registering with the LLU IS user account, you can view your user account and extend the deadlines for issued books, order publications, access full texts in subscribed online databases, save your search results. "Guidelines to searching information on *PRIMO*" are 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 analyzed for search capabilities, thematic coverage, chronological coverage, and access options. Information about databases is prepared and their

descriptions are published on the LLU FB website.

LLU FB users have the opportunity to search for information on topics of the Architecture and Civil Engineering study direction in the following subscribed foreign and Latvian online databases:

- *CAB Abstracts*,
- *CRC Press e-books*,
- *EBSCO eBook Academic Collection* database, which covers a wide range of multidisciplinary topics and contains more than 228515 e-books,
- *EBSCO host databases Academic Search Complete, MasterFILE Premier* and others,
- *ScienceDirect Journals*,
- *Scopus*,
- *Web of Science*,
- *Wiley Online Journals*,

Table 5

Use of foreign databases subscribed to by LLU FB in 2018

Database	Number of connection sessions	Number of searches
<i>Britannica</i>	873	207755
<i>CAB Abstracts</i>	1806	5434
<i>EBSCO</i>	31725	100300
<i>EBSCO e-book</i>	4538	14552
<i>ScienceDirect Journal</i>	21212	53634
<i>Scopus</i>	7451	13586
<i>Web of Science</i>	3733	6822
<i>Wiley Online Journals</i>	2284	6658

In cooperation with the Cultural Information System Centre, various online databases are also regularly offered for a trial period.

Readers are also offered databases created by the employees of the LLU Fundamental Library:

- *Publications of lecturers and researchers of the Latvia University of Life Sciences and Technologies*,
- *Doctoral theses defended at the Latvia University of Life Sciences and Technologies*,"
- *Conference materials of Latvia University of Life Sciences and Technologies*",
- *Publications of lecturers and researchers of the Latvia University of Life Sciences and Technologies*",
- *Publications about Latvia University of Life Sciences and Technologies*".

LLU FB as the deposit library of the Food and Agriculture Organization of the United Nations and the AGRIS National Centre participates in the development of the international AGRIS database.

Library replenishment procedure and database subscription procedure and options

The library collection is mainly compiled according to the recommendation of the academic staff. "Book request form" on the library's website. Taking into account the requests of academic staff and other library users, LLU FB purchases the requested publications. A "Collection Acquisition Policy" has also been developed for the Fundamental Library of LLU, which determines that the main priority in the acquisition of the collection is given to the LLU study programmes and research directions. In accordance with the Law on Compulsory Copies, the LLU FB, as a library of national significance, receives one copy of each printed work and electronic publication in the fields corresponding to the LLU profile.

In cooperation with the Cultural Information Systems Centre, LLU FB offers its users to try out many databases available in the world. LLU FB employees carefully evaluate the statistics of the use of both subscribed and trial databases. As a result, taking into account the test statistics and based on the recommendations of the academic staff, a decision is made regarding which databases the library subscribes to.

A specific range of literature purchased from VBF or project funding is available at the **VBF Information Centre** and the **Valdeka Castle Methodological Classroom**. Here one can find also the gifts from the industry representatives, foreign partners and former employees. Information on the available literature by the theme of the programmes of the study directions is published on the VBF website <http://www.vbf.llu.lv/lv/informacijas-centrs> (in Latvian).

Students in the e-learning environment of LLU also have electronic access to several **teaching aids developed by the academic staff** - books, methodological instructions, etc. Following materials (mostly in Latvian) were developed within the reporting period:

1. Burkane I., Ziemeļniece A., Zilgalvis J. (2019) Mazmezotne Manor (Mazmežotnes muiža). Mazmezotne: Mazmežotnes muiža. 120 p. (in Latvian)
2. Remediation of degraded areas. Research. Planning. Management. (2019) (Berzina M., Grinfelde I., Ile U., Jankava A., Katlapa A., Turks M., Nitavska N., Parsova V., Pilecka J., Skujane D., Spage A., Straupe I.) Jelgava: LLU, 133 p.
3. Ievina D., Kondratenko J. (2014) Guidelines for Sustainable Rainwater Sewerage Management (Vadlīnijas ilgtspējīgai lietus kanalizācijas pārvaldībai) <http://www.bauska.lv/allfiles/files/Projekti/Lietuvas%20parrobezu%20projekti/water/Ilgtspejigas%20lietusudenu%20kanalizācijas%20vadlīnijas%20g93-final.pdf> (in Latvian)
4. Ievina D. (2014) Sustainable rainwater management (Ilgtspējīga lietus ūdeņu apsaimniekošana) (in Latvian).
5. Climate changes in rural areas (Klimata pārmaiņas lauku teritorijās): teaching material in e-study environment (2016). N.Paulins, N.Nitavska, M.Markova, S.Rubene, D.Zigmunde, K.Vugule, U.Ile, S.Strausa, K.Valujeva, V.Baumane, A.Celms, Dz.Kreismane, D.Sterna (in Latvian).
6. Kreilis J. Guidelines for designers "Calculation and construction of screw connections in steel structures" (Palīgīdzeklis projektētājiem „Skrūvēto savienojumu aprēķins un konstruēšana tērauda konstrukcijās”) (in Latvian)
7. Kreilis J. Guideline for designers "Calculation and construction of steel gantry frame" (Palīgīdzeklis projektētājiem „Tērauda portālrāmja aprēķins un konstruēšana”) (in Latvian)
8. Ķirulis B. Construction mechanics (Būvmehānika) (in Latvian). Pieejami: www.llu.lv/buvmehnika
9. Lacauniece I. (2014) Effective Management of Nature
10. Lešinskis A. Online study material „Methodical materials for the course work„ Heating and ventilation of a residential building ” (elektroniskais studiju materiālu „Metodiskie materiāli

kursa darbam „Dzīvojamās ēkas apkure un ventilācija”) (in Latvian)

11. Nitavska N., Zigmunde D. (2014) Rokasgrāmata. Green urban planning. Informative and educational material for municipal development planners. (Zaļas pilsētvides plānošana. Informatīvi izglītojošs materiāls pašvaldību attīstības plānotājiem). Jelgava: Zemgales Plānošanas reģions. 114 p. (in Latvian)
12. Štrausa S. Constructive solutions for energy efficient single-family residential buildings (Energoefektīvu viengimeņu dzīvojamo ēku konstruktīvie risinājumi) (in Latvian).
13. Tilgalis Ē. Water supply and sewerage in villages (teaching guidelines) (Ciemu ūdensapgāde un kanalizācija (mācību līdzeklis) (in Latvian).
14. Ziemeļniece A. (2017) Valdecka Palace (Valdeka pils). Jelgava: Jelgavas Tipogrāfija. 49 p. (in Latvian)
15. Ozola L. (2018) Estimation and construction of wooden structures III (Koka būvkonstrukciju aplēse un konstruēšana III) . Jelgava. 380 p. (in Latvian)

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 process, election procedure, etc.) is regulated by the regulations approved by the Senate of the LLU - *Regulations of the academic positions of the Latvia University of Life Sciences and Technologies (Appendix No.15)*.

Selection

The number of positions of professors, associate professors and assistant professors in the relevant branches of science in accordance with the funding opportunities and the need for the implementation of appropriate study programmes is determined by the LLU Senate following the decision of the faculty council. Occupation of an academic position at LLU takes place in accordance with the procedure of an open competition, which is specified in the *Regulations of the 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 (including conducting classes in these languages);
- continuous improvement of one's academic and scientific qualification.

Election

Based on the received suggestions of the academic structural units regarding the vacant academic positions, the LLU Human Resources Department prepares a draft announcement and submits it to the LLU Academic Personnel and Structural Policy Commission for consideration (hereinafter - the

Commission). After the decision of the meeting of the Commission, the Human Resources 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 Human Resources Department announces an open competition for vacant academic positions by publishing an advertisement in the newspaper "Latvijas Vēstnesis" and on the LLU website.

Elections are held by secret ballot: for the position of a professor and an associate professor - in the relevant sectoral professors' councils not later than within four months from the day of announcing the competition; for the position of an assistant professor, leading researcher, researcher, lecturer, assistant and research assistant - in the faculty councils not later than within three months from the day of announcing the competition; in the position of a leading researcher, researcher and scientific assistant - in the scientific councils of scientific institutes not later than within two months from the day of announcement of the competition.

The contract of employment for an academic post is concluded by the rector for the period of election.

If LLU has a vacant academic position, the LLU Senate may decide not to announce a competition upon the proposal of the faculty council. In this case, the rector may hire a visiting professor, associate visiting professor, visiting lecturer, guest lecturer or visiting assistant for a period of up to two years.

The **individual academic work** of the academic staff members is planned in each study year in accordance with the *LLU academic work calculation regulations* and the Rector's order *On planning, accounting and control of the individual workload* of the academic staff in the study year, which determines the academic staff work components, regulations, procedure for recording and controlling the work.

Remuneration of the academic position is determined on the basis of the regulations of the Cabinet of Ministers "*Regulations Regarding Remuneration of Teachers*" - <https://likumi.lv/ta/id/283667-pedagogu-darba-samaksas-noteikumi> (only in Latvian) and the rector's order *On Teachers' Remuneration*.

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

The procedure for professional development is determined by the Regulations of the Cabinet of Ministers "*On the Education and Professional Qualification of Teachers and the Procedure for Improving the Professional Competence of Teachers*" (<http://likumi.lv/ta/id/269965> (in Latvian)). These regulations determine that the pedagogical qualification required for university academic

staff must be obtained in further education in professional development programs 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 academic term. The LLU has established a professional development program for higher education teachers "*Innovations in the didactics of the higher education institution*". The aim of the program is to improve the knowledge of higher education teachers in the didactics of higher education and the possibilities of their use in pedagogical activities. After mastering this program, a certificate is issued.

The academic staff members of the study direction have the opportunity to improve professionally in various activities, which are funded by various projects or by VBF. On average, each year, professional development is implemented by about 25-48 academic staff members of the study direction participating the following activities:

- **professional development courses and seminars with training** (on average 40 different professional development courses per year);
- **conferences and seminars - as listeners** (average 20 conferences / seminars per year);
- **international exhibitions - as visitors** (on average 3 exhibitions per year);
- **maintaining professional certificates** (11 practice certificates are maintained - architect, landscape architect practice certificates, construction practice certificates in various fields)
- **internship in companies** ESF project no. 8.2.2.0/18/A/014 "Development of academic staff " (11 people in 4 companies).

The professional development of the academic staff is closely related to the increase of the quality and efficiency of the study courses implemented by them. For example, several academic staff members completed internships at the company Envirotech, whose business profile is related to GIS technologies; this promoted the application of these technologies in several study courses "*Geographic Information Systems*", "*Natural Landscape*" etc., as well as expanded the operation of the GIS Competence Centre. Good further cooperation was established with the company. Thus, the current approaches in the field are maintained in the study process, ensuring the competitiveness of students in the labour market of the industry. Also, using VBF funding, several academic staff members have participated in professional development courses related to the development of knowledge of digital tools. This knowledge is essential for the development of LLU civil engineering programmes, ensuring close connection with the current topic of BIM (building information modeling) and BIS (building information system) implementation in the industry. In 2019-2021, using the funding of the ESF project no. 8.2.2.0/18/A/014 "Development of the academic staff ", academic staff members had the opportunity to participate in professional development courses in connection with the acquisition of modern presentation approaches, as well as improve their English language skills. Good knowledge of English is essential for working with foreign students, as well as for establishing mutual cooperation with foreign partners.

In order to motivate the academic staff to improve their qualifications regularly, in recent years **LLU has developed a motivation system**, which envisages annual evaluation of the activities implemented by the academic staff members (including professional development) and granting a motivation bonus based on this evaluation.

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.

The total number of academic staff members participating in the implementation of the study direction Architecture and Civil Engineering is **108 academic staff members**, which makes up a total of 34 full-time equivalent (FTE) positions. This means that the average academic workload per academic staff member is 0.31. This can be explained by the fact that almost all academic staff members also participate in the implementation of other study programmes, carry out research work or work in the field of lifelong learning. Some academic staff members also work as professionals in the field or perform administrative work at LLU. *Appendix No.3* contains **basic information about the teaching staff** involved in the implementation of the study field - degree / qualification, election status at the university, study programs and study courses implemented by the academic staff, the level of knowledge of English (to which applicable).

Out of the total number of academic staff members, 71 academic staff members are from VBF departments, which supervise the implementation of study programmes of the study direction, while 37 academic staff members are from other structural units of LLU. This is related to the thematic areas of study courses approved by LLU, for which certain faculties and departments are responsible, for example, lecturers from the Faculty of Economics and Social Development participate in the implementation of economics and business study courses, while physics and mathematics courses are taught by lecturers from the Faculty of Information Technology.

The percentage distribution of elected and non-elected staff varies depending on the study programme, but on average 56% of the academic staff of the study direction is elected academic staff. This division can be explained by the fact that most of the programmes have a professional orientation, and some of the academic staff are recognized professionals in the field, who also actively work in the industry companies on a daily basis, thus ensuring a closer connection of the study process with the practice. The number of elected academic staff is higher in academic programmes and doctoral programmes, reaching as much as 98% of the academic staff members involved in the programme. The distribution by the obtained scientific degree is similar. Professional programmes, in the implementation of which professionals in the field are involved, are dominated by academic staff members with a Master's degree, while academic and doctoral programmes are dominated by teachers with a doctoral degree. Although the number of lecturers with a Master's degree and a doctoral degree is similar, in terms of workload, the academic staff members with a doctoral degree forms a significant part of the total workload. Thus, the **academic, research and organizational core of the study direction is formed by the teaching staff with a doctoral degree.**

51 academic staff member or 47% also work at LLU as scientific staff, working in research projects and doing contract work for industry companies. A more detailed description of the academic staff involved in the study direction is shown in *Table 6* (as at the academic year of 2020/2021).

Table 6

Number of academic staff (incl. guest lecturers) involved in the study direction in the academic year of 2020/2021 and their qualification

<i>Position</i>	<i>Number</i>	<i>Percentage distribution of the total number,%</i>
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Professors, including Emeritus	18	17
Associate professors, including Emeritus	12	11
Assistant professors	25	23
Lecturers	47	44
Assistants	5	5
Total	108	
incl. teaching staff who are scientific staff. Total:	51	Percentage distribution of the total number of staff involved in science research, %
Leading researchers	33	65
researchers	12	24
research assistants	6	11

The teaching staff of the study direction **also actively participated in the working commissions, committees and councils related to education, research and industry issues** (Table 7). As a result, the academic staff members are aware of the current issues of the industry and follow the policy of the industry. Also, an average of 10-20 lecturers are **invited every year as guest lecturers** by professional industry organizations, state institutions (Latvian Union of Civil Engineers, Zemgale Planning Region, Latvian Association of Local Governments, etc.) to present the most relevant topics to those already working in the field. The fact that the academic staff of study direction are considered for participation in various commissions and councils as experts of the field indicates their competence and high renowned by the industry.

Table 7

Work of lecturers in commissions, committees and councils

No.	Name of the Council, commission, committee	Number of teaching staff
1.	LZP experts (Economics and Entrepreneurship, Construction and Transport Engineering, Environmental Engineering and Energy, Physics, Electrical Engineering, Electronics, Information and Communication Technologies, Materials Science, Landscape Architecture)	12
2.	Members of the Councils of Professors (Council of Professors of Environmental Engineering and Energy, Joint Council of Professors of Architecture at RTU and LLU, Council of Professors of Civil Engineering at RTU)	5

No.	Name of the Council, commission, committee	Number of teaching staff
3.	Members of the Promotion Councils (LLU Construction and Transport Engineering Promotion Council, LLU Information Technology Promotion Council, LLU Environmental Engineering Promotion Council, RTU Related Field Promotion Councils, LLU Landscape Architecture Sub-branch Promotion Council, RTU Architecture Promotion Council)	13
4.	Members of the Latvian Academy of Sciences , Latvian Academy of Agricultural and Forest Sciences, foreign academies of sciences	14
5.	Members of state institutions, ministries, local government commissions (LR State Land Service Real Estate Valuation Advisory Council, LR State Land Service Surveying Advisory Council, Latvian-Russian common state border demarcation commission, Latvian-Russian-Belarusian border crossing commission, Latvian-Belarusian Border Maintenance Commission, Latvian Environmental Science and Education Council, Ministry of Education and Science Study Program Accreditation Commissions, Higher Education Council Expert Commission, Construction Standardization Technical Committees, Standardization Technical Committee Lightning Protection, Riga Monuments Council, Construction Industry Expert Council, etc.)	15
6.	Members of Scientific Committees, Editorial Boards and Conference Organizing Committees	19
7.	Members of the board, councils, commissions of professional branch organizations (Latvian Surveyors Association, Latvian Association of Cartographers and Geodesists, GIS Association, Latvian Association of University Professors, Latvian Economists Association, Latvian Association of Civil Engineers, Latvian Concrete Association, Latvian Acoustics Association, Latvian Landscape Architects Association, Latvian Union of Architects, Latvian Council for Sustainable Construction, etc.)	26
8.	Members of international organizations (International Union of Geodesy and Geophysics, European Association of Landscape Architecture Schools ECLAS, World Cultural Heritage Committee ICOMOS Latvia Branch, International Association of Agricultural Sciences NJF, Institute of Green Economy (GEI), International Association of Bridge and Building Engineers, International Concrete Federation)	12

No.	Name of the Council, commission, committee	Number of teaching staff
9.	Members of the Thesis State Examination Commissions (LLU study program commissions, RTU study program Geomatics, Heat, gas and water technologies, Architecture final work commissions, Riga Construction College program commissions)	20
10.	Members of competition juries, commissions (Competitions The most energy efficient building in Latvia, the best building of the year, Sand sculpture and Ice sculpture festivals, etc.)	22

The qualification and contribution of the teaching staff is also noticed by the industry, the state and local governments, presenting the teachers with **awards, letters of commendation and gratitude**. Latvian and international awards and recognitions received during the reporting period:

- Latvian Academy of Sciences, SIA ITERA LATVIJA and RTU Development Fund - seven awards received;
- Medal of the Ministry of Agriculture of the Republic of Latvia "For diligence" and letters of commendation
- Highest national awards: Order of Viesturs, IV degree
- European Academy of Sciences and Arts and Latvian Academy of Sciences Award for Young Scientists (Felix Award);
- Award of the Latvian Surveyors Association: Honorary Badge "For Merits in Latvian Surveying"
- Grand Prize of the Construction Industry "Foundation Stone" and the award "Engineer of the Year"
- Letters of commendation from the Union of Civil Engineers "For contribution to the training of young civil engineers"
- Award of the European Council of Landscape Architecture Schools ECLAS;
- III degree Medal of the Ukrainian Society of Geodesy and Cartography "For merits in geodesy and cartography".
- Award for the competition "Woman in Architecture and Construction";
- "Zemgales Laiks Ziedonis" for contribution to the development of Zemgale region
- LLU letters of commendation and recognition, recognition of LLU textbooks and study materials;
- Awards of various competition commissions in connection with professional activities in the industry
- Letter of commendation "Volunteer of the Year" for volunteer work in the activities of the Big Cleanup.

During the reporting period, the **academic staff of the study field has implemented mobility** within the framework of several activities:

- ERASMUS +, NordPlus or other mobility programmes for lectures or exchanges
- BOVA (Baltic Forest, Veterinary and Agricultural University Association) intensive courses
- Within the framework of international summer schools - lecturing and conducting classes

- Participation in international conferences, exhibitions and workshops
- Participation in EPW (European Project Week) activities
- Industry-initiated activities (e.g. BIM training abroad)
- Within the framework of international project activities (seminars, workshops, thematic excursions, etc.)
- As reviewers of doctoral theses and participating in doctoral councils in foreign universities (Swedish University of Agricultural Sciences, Estonian University of Life Sciences)
- Internships at foreign universities.

Detailed information on each member of academic staff is enclosed to their **CV**, which is available in the *Appendix No.4*.

Every year it is **planned to engage foreign visiting professors from VBF funds**, on average 1-3 academic staff members every study year, depending on the available funding.

The departments also carry out activities to establish long-term cooperation with foreign universities. It provides an opportunity to **engage foreign guest lecturers also within the framework of other activities** (ERASMUS +, NordPlus mobility programmes, Swiss grant, international projects). Thus, every year within the framework of various activities (including with VBF funding) an average of 3-7 foreign guest lecturers are engaged. For more information on engaging foreign guest lecturers, see *Chapter 5.2.* and *Appendix No.13*. **Statistics on incoming and outgoing mobility of academic staff** members during the reference period are provided in the *Appendix No.13*. Assessing the activity of academic staff for the implementation of mobility to foreign universities and other institutions, it must be concluded that the possible financial tools and programs are sufficient. The greatest challenge is the planning of mobility activities, as most members of academic staff (including foreign ones) are heavily loaded with everyday academic and scientific work.

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.).

Support for students in the study process, career development, as well as financial and information support are provided to full-time and part-time and foreign students.

Support in the study process

Support for students in the study process is based on a student-centered education approach

- Respecting the needs of students, the study environment accessible to each student is ensured, the accessibility of the environment in the premises is also ensured. Students have the opportunity to attend classes and use study and scientific equipment, to use the study infrastructure also outside of classes.
- Lecturers are available for students for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail.
- The review of student complaints is regulated by the LLU Study Regulations (<https://www.llu.lv/lv/studijas> (in Latvian); <https://www.llu.lv/en/study-guide-documents> (in English)), but complaints are also reviewed by the commission. In addition, students are invited to seek assistance by escalating the issue, starting from the director of the study

programme, the head of the department, vice-dean, dean and, finally, the vice-rector for studies.

- In order to ensure the participation of students in the improvement of the study process, the director of the study programme regularly listens to the students' suggestions and explains possible solutions for improving the studies.

Career and psychological support

- In all study programs of the study direction Architecture and Civil Engineering there is a close cooperation with companies and organizations in the field. Practice days, study trips to companies, guest lectures with the participation of industry professionals and other activities are organized, that help to find the most suitable specialization and direction, where to work after graduation of the study programme. Also, in cooperation with companies, students are provided with traineeships, where they often continue to work even after graduation.
- There is no separate Psychological Service at LLU, but students have the opportunity to discuss current study issues with the director of the study program, head of the department, vice dean or dean, as well as to participate in LLU Student`s Self-Government, where joint student activities are organized and support is provided. LLU Student Self-Government (LLU SP) is an organization representing university students, which deals with important issues of academic, social, cultural and sports life, represents and defends students' opinions and rights. Student self-government provides significant support in student involvement, adaptation and the study process

Accessibility to environment

Accessibility to the environment for students and employees with movement and visual impairments is ensured both in the central study building of the Faculty of Environment and Civil Engineering and in Valdekas Castle. Information about the accessibility in LLU is available: <http://www.vbf.llu.lv/lv/vides-pieejamiba-personam-ar-invaliditati>(in Latvian)

Financial support

During the studies, financial support for students is provided in the form of scholarships (<https://www.llu.lv/stipendijas>(in Latvian)). Students may apply and compete for:

1. State scholarship - in Master's and undergraduate studies the monthly scholarship is 99.60 EUR (during COVID-19 it was increased to 200 EUR per month), in doctoral studies - 113.83 EUR;
2. One-time scholarship - during the semester the student can apply for a one-time scholarship in the amount of 2 minimum scholarships;
3. Scholarship for obtaining a scientific degree - it is a scholarship equivalent to a loan in the amount of 85.37 EUR (the award of new scholarships has been terminated as of March 1, 2020)
4. LLU Development Fund (LLU AF) scholarship - the fund offers students a total of 18 scholarship programmes (from 40 to 1500 EUR). Scholarships are both monthly and one-time.

Students of the study direction also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU (Senate, Jāņa Čakstes, Kārļa Ulmaņa etc.), as well as the scholarships named by A.Tramdahs (260 EUR per month) and J.Bīķis (150 EUR per month) of the Faculty of Environment and Civil Engineering. Students are supported also by special scholarships for the field. For example, the scholarship of RTU Development Fund and SIA Itera Latvija for landscape architecture students and scientists (150 EUR per month), that has been awarded since 1998, SIA UPB, SIA Peri, Latvia State forests etc. Scholarships offered to students in the study programmes of the study direction "Architecture and Civil Engineering" are summarized in the

Table 8.

Table 8

**Scholarships offered to students in the study programmes of the study direction
“Architecture and Civil Engineering”**

Stipendijas / studiju līmenis	Bachelor`s studies	Master`s studies	PhD studies
State scholarship	X	X	X
Kārlis Ulmanis scholarship	X	X	
Senate scholarship	X	X	
Jānis Čakste scholarship	X	X	
Jānis Rūvalds scholarship	X		
Mirdzs Oškalne scholarship	X	X	
Jānis un Millija Kāvuši scholarship	X	X	X
LLU Student Self-Government scholarship	X		
Jānis Biķis scholarship	X		
Arturs Tramdahs scholarship	X		
SIA Peri scholarship	X		
SIA Itera Latvija un RTU Development fund scholarship	X	X	
Total number	12	7	2

Tuition fee discounts

LLU offers tuition fee reductions (50-100%) for the following successful students:

1. LLU employees who study in doctoral study programmes.
2. For the children of LLU employees.
3. People with first and second degree disability.
4. For orphans or surviving dependents.
5. For student athletes.

LLU provides **support to students from abroad** in the following matters:

- application for studies is implemented using the e-admission system “Dream Apply”, which provides partially formalized admission procedures and thus significantly facilitates the communication with the LLU for the applicant; SSC coordinators individually answer specific questions of interest to applicants;

- all foreign students are provided with places in well-equipped student service hotels;
- in order to acquaint the foreign full-time and exchange students with the study and living environment of LLU and the cultural environment of Latvia, a “Welcome Week” is organized for them in the first week of each semester, during which corporate teambuilding events take place;
- LLU SSC provides technical support in obtaining / extending visas, residence permits, as well as helps resolving insurance issues;
- LLU SSC and faculty external relations coordinators, as well as study programme directors inform students from abroad about LLU internal regulations and their application practice, provide consultations on study and household issues, help to draw up documents, help to solve problems, etc.
- The LLU has an Erasmus Student Network group and also the LLU Student Self-Government, which organizes students' leisure and cultural events.
- LLU external relations coordinators inform foreign students about the available health care at family doctors' practices and Jelgava polyclinic, and if necessary, perform the functions of a companion;
- starting from 2019/2020, a survey of foreign students on the courses they have acquired is introduced every semester, which shows their satisfaction with the quality of the 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).

The research directions of the study direction are closely related to the common tendencies and current events in the field in Latvia and abroad, the Latvian Smart Specialization Strategy and the strategic specialization of LLU in the field of bioeconomy, as well as the common goals and development vision of LLU. The development strategy of LLU for 2015-2022 <https://www.llu.lv/index.php/en/mission-and-vision> defines several priority research directions in life sciences, engineering sciences and social sciences. Five research directions are implemented by the academic staff members of the study direction Architecture and Civil Engineering.

The directions **“Sustainable civil engineering, development of new, innovative building materials, research of their properties”** and **“Safety and performance of building structures under long-term load”** correspond to the goals and tasks of the Latvian construction industry strategy. The research directions are also in line with current international strategies, such as the European Green Deal, which, in turn, is linked to Latvia's Sustainable Development Strategy and several initiatives based on the introduction of the circular economy in Latvia. These include research into the use of wood, as well as various native biomaterials in construction, the development of new innovative building materials, such as new composite materials on foam gypsum basis with hemp fibre reinforcement. Also of constant relevance are the safety of buildings,

energy efficiency of buildings, sound transmission and absorption in premises and other aspects ensuring the quality of the living environment in construction, aimed at prevention of danger to health and life of every person. In recent years, as a result of research activities in these areas, important scientific laboratories have been developed for the study of the properties of building structures and building materials, which allow to get involved in significant research projects and implement contractual research work.

The development strategy of the Latvian construction industry for 2017-2024 emphasizes the digital competence of specialists, which marks the topicality of the research direction ***“Remote sensing, geodesy and geospatial research”***. More and more remote sensing technologies are used in the national economy - for studying the current situation, planning development scenarios and managing resources. Within the framework of this direction, attracting funding from the Interreg Latvia-Lithuania cross-border cooperation project, a GIS Competence Centre was established and is actively working on remote sensing and geospatial research, also professional qualification improvement activities are provided in the area of application of ArcGIS software.

The above-mentioned research directions are also among the specializations and research topics of the doctoral programme Civil Engineering. In the doctoral programme Civil Engineering, doctoral degrees have been awarded, defending doctoral theses on the following topics: Investigation and Prognosis of Steel Fiber Concrete Deformation Properties; Foam Gypsum Technology Development for Sound Absorption Material Production; The Evaluation and Improvement of the First-Order Levelling Network of Latvia; Thermal Energy Consumption in Public Buildings. At the same time, doctoral students are working on topics in the following thematic blocks: Research on Fire Impact to Structures Made of Foam Gypsum Composite Material; Optimization of building energy resources; Modeling of stress-strain development of building structural elements under static short-term and long-term loading; Application Possibilities of Geographic Information Systems and Remote Sensing Technologies in Spatial Planning in Latvia

Sustainable development is based on smart resource management, including land and natural resource management. Research in these areas is included in the research directions ***“Urban and rural landscape research and development”*** and ***“Land and real estate management research”***.

The aim of the research directions is to ensure smart management of land and natural resources and to identify, preserve, develop and manage the value of the Latvian cultural landscape, including the urban and rural environment, as an essential component of national identity. The research directions are based on the conclusions set out in the European Landscape Convention, which focuses on the identification, preservation and transmission of the specific characteristics of each country's landscape to future generations, as well as the right of everyone to a quality living environment and the surrounding landscape. These principles are also defined in the vision of LLU, which emphasizes the sustainable use of natural resources to increase the quality of life of the society. Good quality living environment and development of territories, including strengthening of national identity, is also included in several strategic documents of Latvia, such as the National Development Plan for 2021-2027, the Sustainable Development Strategy of Latvia for 2030, etc. The research direction is related to current initiatives, which include the principles of sustainable development and the green economy, and which are included in several international strategies, such as the European Green Deal. These initiatives are also related to the provision of biodiversity, ecosystem services, development of solutions adapted to climate change (EU Biodiversity Strategy; EU Green Infrastructure Strategy, etc.). These principles, in turn, are included in the Sustainable Development Strategy of Latvia and in several initiatives based on the introduction of the circular economy in Latvia (Latvian Bioeconomy Strategy, etc.). The above-mentioned research directions are also among the specializations and research topics of the doctoral programme Landscape

Architecture. **During the reporting period, doctoral theses on the following topics were developed and defended:** Latvian historical gardens and parks in the modern rural landscape; Identity of Baltic Sea coastal landscapes in Latvia; Landscape of Latgale churches; Contemporary art in the Latvian cultural landscape; Interaction of landscape and interior in the architecture of Latvian educational and art buildings; Landscapes of watermills and small HPPs in Latvia; Aesthetic and ecological planning of green areas in Latvian cities; Landscaping quality of rehabilitation gardens and parks; Road landscape, their values and development scenarios. At the same time, doctoral students are working on topics in the following thematic blocks: Quality of living area and living space, including adaptive planning to climate change in urban environment and urban agriculture; Public space and public participation, the right to a quality landscape for everyone; Rural landscape and cultural heritage, including cultural and natural values, green infrastructure.

The doctoral study programmes Civil Engineering and Landscape Architecture play an important role in the development of the research directions of the study field, as the research topics of the doctoral students are closely integrated into the research activities of the field. Academic staff members often involve doctoral students in their research, gradually developing scientific succession and establishing recognizable scientific schools. It is also possible to apply for internal grants at LLU, where doctoral students work on their research topics under the guidance of research supervisors.

More detailed information on the implemented projects is included in *Chapters 4.2., 4.3., 4.4.* **The list of projects implemented by the academic staff** of the study field is attached in the *Appendix No.12.*

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.

Linking the scientific research of the study direction Architecture and Civil Engineering with the study process is implemented through the following activities:

- **Integration of fundamental knowledge and findings approbated in research into the content of study courses**, improvement of study programmes in accordance with current events in the field
- **Development of new specializations or programs**
- **Guidelines or other materials prepared** within the framework of the projects are included in the list of sources of information to be used in the study courses
- **Promoting international cooperation and recognition** by cooperating with foreign scientific institutions by publishing research results in international journals and presenting them at conferences; International cooperation promotes the **involvement of foreign guest lecturers and students in the study process**
- **Development of the infrastructure and material and technical provision** necessary for the implementation of studies and research within the framework of research projects
- **Involvement of students in research**, creating a succession of science, motivating students to continue their studies in Master's and doctoral study programmes, to build an academic or research career.
- **Attracting new academic staff members** from among students. Often, interest in the academic work is formed by participating in the research work of the department or by

studying for a doctorate.

The research work of the academic staff in the projects has facilitated not only the acquisition of **new knowledge and its inclusion in the content of the study program**, but also **the development of laboratories**, attracting funding for the purchase of new equipment and facilities. For example, ERDF project *"Efficiency of fibre reinforced cement composites in structural walls"* (No.1.1.1.2/VIAA/3/19/487) of the programme "Growth and employment" 1.1.1 support objective "To increase the research and innovative capacity of Latvian scientific institutions and their capability to attract external funding, investing in human resources and infrastructure". Already before the particular project there have been significant research activities implemented during the research contracts with companies from the industry. For example, research contract *"Loading tests of concrete manholes and inspection chambers in accordance with the standard LVS EN 1917"* (SIA Guno M, SIA PRIORITET, AS SMILTENIEKI etc.), experimental studies on *the mechanical strength of concrete construction products* (SIA Inspecta Latvija), experimental studies on *shear capacity of bolted joints* (SIA CMB, SIA "Empower", SIA UPPE), research contract *"Fibre reinforced concrete prisms: production and measuring the flexural tensile strength in accordance with the standard LVS EN 14651"* (SIA PICHE), experimental studies on *load bearing capacity of precast concrete slab-wall connection* (SIA UPB) etc. Within the mentioned above project **3rd year students were involved**. After the completion of the project a new research contract was concluded with the company AS UPB (Nr. 3.2.2.-9/28), resulting in **attraction of new doctoral student for studies in the PhD study programme** Civil Engineering at LLU in 2021. Within the framework of his doctoral thesis student is working on the topic of precast concrete slab-wall connections. **The doctoral student is also a lecturer of the program.**

Within the cooperation between the companies from the industry, as well as by attracting ES funds within the project *"Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision."* (Nr. 1.1.1.4./17/I/003) implemented by LLU, **significantly developed Scientific Laboratory of Structural Engineering**. It allows to implement research activities of various scales and complexity on safety of building structures and their operation under sustained loading, as well as to supervise research of doctoral students, for example within the framework of LLU internal grants. One of projects is *"Analysis of the effect of graphene and steel short fibers on the stiffness of reinforced concrete structures"* Z49 (01.06.2020. – 31.05.2022.) of the LLU programme "Strengthening of scientific capacity at LLU".

The findings and results obtained in these studies are also included in the content of several study courses of civil engineering study programmes, for example, *Special Building Structures, Reinforced Concrete and Masonry Structures, Scientific Work in Specialty, Principles of Scientific Work*.

By attracting European Union funding, the project "Strengthening the research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions" (No. 1.1.1.4./17/I/003) implemented by LLU has **created a unique Acoustics Laboratory**, which allows to study sound absorption in large-scale construction products before they become part of the building. In the field of acoustics, the academic staff of the programme has been working on the analysis of experimental samples in the industrial study "Determination of the sound absorption coefficient of four experimental samples in an impedance tube". The findings and results obtained in these studies are also included in the content of several study courses, for example, *Acoustics, Building Materials, Principles of Scientific Work, Diploma project*.

Within the framework of several projects, **study materials are prepared**, which are included in the list of literature sources to be used in the study course. For example, Interreg Latvia–Lithuania

Programme 2014–2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions” (BrownReg). The project, in cooperation with LLU and Latvian and Lithuanian municipalities, addressed the possibilities of revitalization of former industrial territories. Within the framework of the project, a good practice **guide on brownfield revitalization** has been published, which is **used in the Master's study course** *Industrial Landscape Design*. This course also includes several insights from the project results, as well as within the study course **students had the opportunity to participate in the project** and gain new knowledge in thematic seminars with lecturers from various fields. The project included modelling of 3D development scenarios, marking digital tools as a successful approach to research and public information.

In cooperation with local governments, research is carried out at all study levels. For example, students of the Bachelor's and Master's study programmes in landscape architecture and planning **carry out research on the current situation and development opportunities of real territories** within the framework of various study courses. The results are presented to local government representatives. In its turn, the **academic staff members of the study direction implement contract work with local governments**, for example, a thematic plan “Landscape concept of Ikšķile and villages” has been developed. The **methods developed in the project are integrated in the Master's study course** in the methodology part of the study work to be developed in the *Greenery Design Concepts* course.

Currently project of the State Research Program “Sustainable Spatial Development and Rational Use of Land Resources” (No. VPP-VARAM-ITAZRI-2020 / 1-0002) “Sustainable Management of Land Resources and Landscapes: Assessment of Challenges, Methodological Solutions and Proposals” (LandLat4Pol) has been initiated. The project is important not only at a national level, as the acquired knowledge and results will serve as a basis for recommendations to policy makers in the field of land use and landscape policy. In the course of the project examples of good practice will be prepared for industry professionals and researchers in the project areas, which will also be an important teaching material. The project will also develop approaches adapted to Latvia in landscape assessment, which will also be included in the content of landscape architecture and planning study courses, as well as increase the qualification and experience of the academic staff. Within the project, Master's students and doctoral students are involved. In addition, in the scope of the project it is intended to create a **Master's specialization “Landscape Management”**.

In 2019, the doctoral thesis “ Road landscape, their values and development scenarios ” was defended, which included a new approach in the field of **landscape architecture and planning based on the use of 3D digital tools**. The new doctor of sciences continues to work at the Department of Landscape Architecture, which allows to transfer the knowledge acquired in the research into the process of studying landscape architecture at all levels, as well as to continue research work. The doctoral student together with the researchers of the department participated in the Interreg Latvia-Lithuania Program 2014-2020 project “Creation of Joint GI Education to Increase Job Opportunities in the Region” (No. LLI-206) (2017-2020), within which approaches to the use of ArcGIS programs were developed for landscape research, planning and management with the aim of integrating the **use of ArGIS in separate study courses in both Bachelor's and Master's study programmes, as well as in research**. Within the framework of this project, a **unique GIS Competence Centre** has been established in Latvia, which is equipped with high-performance workstations, modern remote sensing and geospatial data collection tools and equipment. Training materials for the use of ArcGIS software in various areas of the economy have also been developed. The materials are integrated in the content of several study courses in the Bachelor's study programmes “Land Management and Surveying”, “Civil Engineering” and “Landscape Architecture and Planning”. In order to support the use of digital tools in the study process and research, **a computer class** with 25 high-performance workstations with appropriate

software has been created in the study building of Valdeka Castle. The classroom was created by attracting European Union funds. Today, ArcGIS applications are increasingly used in research, as they provide more accurate data interpretation, interactive feedback, and better process modeling and monitoring capabilities. Thus, for example, the projects of the Rural Support Service of the Ministry of Agriculture of Latvia “Digitization of Beekeeping” and “Application of Remote Sensing Technologies for the Evaluation of Orchards” are being implemented.

By cooperating in international research projects, cooperation with foreign higher education institutions is strengthened, which allows to address and **attract foreign lecturers in the study process or research**. For example, in the National Research Programme project “Sustainable Management of Land Resources and Landscapes: Assessment of Challenges, Methodological Solutions and Proposals”, Simon Bells, a world-renowned professor from the University of Edinburgh and the Estonian University of Life Sciences, was involved as a project lead expert. The professor is also regularly involved in the study process, providing students with valuable knowledge about forest landscape planning.

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 international cooperation of the study field in research and artistic creation has been implemented within the framework of several activities:

- Research project activities
- Development of joint scientific articles
- Supervision of doctoral theses, consulting, reviewing and participation in foreign doctoral councils
- Organization of international scientific conferences.

International cooperation within the framework of projects mainly includes the implementation of joint activities, sharing experience and knowledge or inviting foreign experts to solve specific issues. During the reporting period, several international projects were implemented. In the project “Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas” of the European Economic Area financial instrument program “National Climate Policy” LLU co-operated with the Innovation Circle Network Association (Norway) and the Norwegian University of Life Sciences. In co-operation with the association, the project provided an opportunity to meet with Norwegian spatial planners and gain valuable knowledge about climate change mitigation tools in spatial planning. The obtained findings were integrated within the framework of several study programmes, because the project involved not only the academic staff members of the study direction Architecture and Civil Engineering, but also from other faculties and structural units of LLU. The modules created in the project are freely available to anyone interested (<https://estudijas.llu.lv/course/view.php?id=1365> ; <https://estudijas.llu.lv/course/view.php?id=1640>) and are used in the study process of the study direction.

In its turn, within the research project of the Baltic-German Higher Education Office “Evaluation of Deformation of Geodetic Instrument Calibration Polygon Elements” it was possible to engage a professor from Karlsruhe University of Applied Sciences, Germany to give guest lectures in higher

geodesy. In cooperation with all branches of the study direction and the Klaipėda State University of Applied Sciences, LLU implemented the Interreg Latvia-Lithuania Programme 2014-2020 international cooperation project „Creation of Joint GI Education to Increase Job Opportunities in the Region” (No. LLI-206) (2017-2020). Within the framework of the project, approaches have been developed for the use of ArcGIS software in landscape research, planning and management with the aim of integrating the use of ArGIS in separate study courses in both Bachelor's and Master's study programmes, as well as research.

During the reporting period, several lecturers established cooperation with foreign universities in connection with the **supervision, consulting or review** of doctoral theses. Several academic staff members have also participated in the promotion boards of foreign universities, such as the Swedish University of Agricultural Sciences and the Estonian University of Life Sciences (EMU). Cooperation with the EMU in the area of landscape architecture takes place for a long time, there are regular meetings of the academic staff, the leading EMU professor in landscape planning has been regularly engaged in the study process and research since 2013 and who also acted as the second advisor to the doctoral thesis “Road landscape, its values and development scenarios”. Joint seminars of EMU and LLU doctoral students have been organized under the guidance of the academic staff of both universities, where topics relevant to doctoral students on methodology, work structure and preparation of publications are discussed. LLU doctoral students have gone to EMU to get acquainted with the scientific literature available there. In the field of land management, surveying and management, in recent years, co-operation has been established with the State Agrarian University of Kazakhstan, where the academic staff of the study direction is involved in the advising and consulting on several doctoral theses. International cooperation in the supervision, consulting and review of doctoral theses provides a significant contribution to the improvement of the quality of studies and research of doctoral programmes and a closer connection with the latest research initiatives in the world.

International cooperation in research also takes place by working together on the **preparation and publication of international journals in the field, as well as on the organization of international scientific conferences**. The International Conference on Safety and Durability of Structures (ICOSADOS) is being organized in cooperation with the University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and the Wrocław University of Environmental and Life Sciences in Poland. The cooperation has facilitated not only the exchange of research work experience, but also the International Summer School of Building Engineering Students with the participation of students and lecturers from the participating universities. Similarly, co-operation is taking place in the organization of the international conference Baltic Surveying, in which the Department of Land Management and Geodesy of LLU, the University of Warmia and Mazury in Olsztyn, Poland and Vytautas Magnus University in Lithuania. In parallel with the conferences, the only scientific journal on land management, surveying and geodesy in the Baltics, “Baltic Surveying” (<http://www.balticsurveying.eu/>), is published. Within the framework of the cooperation, BOVA intensive courses for Master's students in the field of land management, management and geodesy are also organized.

The well-known foreign scientists involved in the work of the editorial board of the study direction “Landscape Architecture and Art” (https://ilufb.ltu.lv/Raksti/Landscape_Architecture_Art/) (indexed on Scopus and WoS since 2016) also make a valuable contribution to improving the quality of the journal. Possibilities for publication in the journal are actively used by the doctoral students of the doctoral study programme Landscape Architecture and the academic staff members of this study direction. Given that the journal is the only scientific publication in the Baltics in the field of landscape architecture and planning, the articles included in the journal serve as valuable study and research material in study programmes of all levels in the field of landscape architecture.

By collaborating in research, articles are jointly developed and published in all areas of the study direction, which serve as a contribution to a broader and more comprehensive analysis of the current issues in the field. In turn, the academic staff of the LLU study direction, by participating in the review of articles of international conferences (ECLAS, IFLA, RTU and LLU international conferences, etc.), broaden their perspective on current issues in the field, the possibilities of using modern and innovative tools.

The future plans of the study direction are related to **the development of innovative outdoor laboratories**, which would allow testing various solutions in Latvian conditions (building enclosing elements, green roofs, rain gardens, etc.). It is also planned to **closely cooperate with companies and state institutions** (ministries, local governments) in order to work together in the implementation of research relevant to the industry. It is planned to **strengthen the main research directions** in the subfields of the study direction (according to the LLU Development Strategy 2015-2022), developing fundamental science and promoting their recognition at the international level (participation in EU project calls, development of high-level publications, etc.).

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.

During the reporting period, **the research quality of the study direction has significantly increased**, which has been promoted by the common **Latvian state policy in the field of higher education, emphasizing the role of synergy between science and studies**. At the national level, funding (science-based funding) is allocated to higher education institutions each year according to each research activity. LLU further uses the science funding allocated to it **to achieve its goals, including providing motivation bonuses for academic staff members for research work activity**. The part of the science base funding that remains at the disposal of the Faculty of Environment and Civil Engineering (VBF) is used to **support the academic staff in participation in international conferences and publication of scientific articles**, development of research infrastructure, maintenance of scientific journals in the field of study. Also, during the reporting period, the number of EU-funded programme projects has increased, in which the academic staff members of the study direction can successfully prepare project applications and apply for funding for their implementation.

The academic staff members of the study direction are actively involved in the research activities in the following areas:

- European Union funded research and methodological projects;
- Publicly funded projects (National Research Programme, Ministry of Agriculture and Ministry of Environmental Protection and Regional Development projects, Rural Support Service projects, etc.);
- Contract research for companies, municipalities and other institutions;

- LLU internal research projects;
- In the preparation of scientific articles (lists of publications by academic staff are attached in *Appendix 5*;
- In editorial boards of scientific articles and journals, as reviewers;
- In organizing scientific conferences.

Research directions, implemented projects, published journals and organized conferences are summarized on the website of the Faculty of Environment and Civil Engineering <http://www.vbf.llu.lv/lv/zinatne-un-inovacija> (in Latvian). The research directions of the study direction are described in *Chapter 4.1.*. The projects implemented are provided in *the Appendix no.12*, also, a more detailed description of the links between the implemented projects and the study process is provided in the description of each study programme in *Part III* Characterization of study programmes. The scientific work of the academic staff has promoted not only the acquisition of new knowledge and its inclusion in the content of the study programme, but also the development of laboratories by attracting funding to purchase new equipment and tools.

The **total number** of articles prepared and published by the academic staff of the study direction is **861**, including 484 scientific articles in SCOPUS / Web of Science databases. The list of publications and patents is attached in *the Appendix No.5*. Between 2019 and 2021, the number of publications and reports has slightly decreased due to limited mobility during the Covid-19 pandemic. It should be noted that each of the majority of the teaching staff involved in the study programme has published in peer-reviewed publications, including international ones, during the last six years. Some lecturers have a smaller number of publications, as they have recently started working at LLU, it should also be noted that some lecturers do not have publications, this is due to the fact that these lecturers work full time in the field and have at least five years of practical experience, which is in accordance with the Higher Education Law and accreditation guidelines. These lecturers lead practical works and traineeships in the study programs. Some lecturers have recently started working at LLU, including doctoral students, so the number of publications is not yet high.

The number **of implemented projects and research contracts** is 53. The list of implemented projects in *the Appendix no.12*. Number of publications and implemented projects is shown in the *Table 9*.

Table 9

Distribution of the number of publications, reports, patents and projects (2013-2021)

Type of publication or report, projects	Number
Publications	861
International, peer-reviewed scientific publications included in Web of Science or Scopus scientific literature databases	484
Publications in anonymously-reviewed international scientific journals, incl. proceedings	273
Published scientific monographs	9
Materials of international conferences (Abstracts)	36
Popular science and scientifically-methodical publications	58

Number of internationally approved or maintained patents, licenses and know-how	1
Scientific projects	52
International projects	8
Other EU funded projects	4
State, state institution (ministry) projects	5
Contract research	24
LLU internal grants	11
including projects involving students	18

Scientific and scientific-practical conferences are regularly organized in the field of study, as well as several **collections of scientific articles and journals are published**:

- **International scientific conference Baltic Surveying** and **scientific journal “Baltic Surveying”** <http://www.balticsurveying.eu/> (AGRIS, CABICAB Abstracts, EBSCO Applied Sciences Ultimate, Primo Central (ExLibris)) in cooperation with the University of Warmia and Mazury in Olsztyn, Poland and Vytautas Magnus University, Lithuania. The journal has a significant impact on the scientific audience in the Baltics in the field of land management and geodesy.
- Annual **scientific-practical conference “Land Management and Surveying”**
- The **International Conference on Safety and Durability of Structures (ICOSADOS)** in cooperation with the University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and the Wrocław University of Environmental and Life Sciences in Poland.
- **Scientific journal Landscape Architecture and Art** https://llufb.llu.lv/Raksti/Landscape_Architecture_Art/ (Scopus, Web of Science™, Clarivate Analytics /Thomson Reuters/, AGRIS,CAB Abstract, Crossref, EBSCO Art & Architecture Source, EBSCO Discovery Service, EBSCO The Belt and Road Initiative Reference Source, Primo Central (ExLibris)). Landscape Architecture and Art is the only scientific journal in Latvia in the field of landscape architecture and planning, which simultaneously addresses both Latvian scientific audience and foreign scientists, as it is international and indexed in several known databases.
- Annual **scientific-practical conference in Landscape Architecture**
- Scientific conference Research for Environment and Civil Engineering Development (2013, 2017) and conference proceedings https://www.llu.lv/conferences/reced_2017/proceedings

The academic staff participates in international professional and scientific organizations and working groups, which allows to identify current issues in the field and the learn about the experience of foreign partners in the implementation of research. The academic staff of the programme works in such organizations as the Institute of Green Economy (GEI); International Association of Bridge and Structural Engineers; International Building Commissioning Standards Development Group; International Concrete Federation (fib); American Society of Engineers (ASHRAE); European Federation of Engineering Systems (REHVA); NJF (Nordic Association of Agricultural Scientists); ICOMOS (World Heritage Committee); European Academy of Land Use and

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.

Students of the study direction are involved in research and artistic creation within the following areas:

- **Within the study courses** included in the study programme plan, working on study or course papers, research papers, **final theses** (Bachelor's, Master's and doctoral theses)
- **In research and artistic creation in cooperation with companies, local governments and other stakeholders** within the framework of research study courses
- Within the framework of **creative plein airs, international summer schools**
- By **participating in research and creative projects** implemented by the academic staff of the study direction.

Examples of involvement of students in research activities are shown in the *Table 10*.

Table 10

Involvement of students of the study direction in research activities

Type of students' involvement in research and artistic creation	Example
<i>First level professional higher education study programme Civil Engineering</i>	
Taking into account the professional orientation of the programme, as well as the form of implementation in part-time studies, the students of the programme are not involved in research. However, within the framework of separate term papers and qualification papers , students work on both the research and the creative part in developing projects.	The study programme includes several term papers, which also include the research and creative part in developing projects. For example, Roads and bridges, Building structures, Engineering systems, Architecture, Qualification work.
<i>Professional Bachelor's study programme Civil Engineering</i>	
The study programme includes separate research study courses , within which research work is developed, as well as a diploma project , which includes both the research and creative part.	The study programme includes research courses (Basics of Scientific Work, Scientific Work in the Specialty) and Diploma project

Type of students' involvement in research and artistic creation	Example
Development of the research work in cooperation with industry companies and local governments within the framework of study courses	For example, a research project on Rukki architectural nodes. In cooperation with SIA "Vimbass MF" a project "Design of modern and updated cow farms in compliance with modern welfare norms in agricultural buildings" has been developed, in cooperation with SIA "Zemgales tehnoloģiskais centrs" the project "Design of modern wooden buildings" was developed.
Within the framework of separate term papers , students work on both the research and the creative part in developing projects.	The study programme includes several course works that also include the research and creative part in developing projects (Architecture, Roads and bridges, Heating and ventilation, Water supply and sewerage, Agricultural buildings, Hydraulic structures)
Summer schools, plein airs and other extracurricular activities	Students carry out research and develop proposals on specific topics by participating in international summer schools for civil engineering students and the European Project Week (EPW) activities.
Professional Master's study programme Civil Engineering	
The study programme includes separate research study courses , within which research work is developed, as well as a Master's thesis , which includes both the research and creative part.	The study programme includes research study courses (Research methodology and data processing; Research in construction (practice)) and Master's thesis. Within the framework of research study courses, work is being done on the development of the research part of the Master's thesis.
Development of research work in cooperation with companies, municipalities and other stakeholders within the study courses	For example, on behalf of Ozolnieki municipality, within the framework of the Master's thesis, "Problems and solutions of commissioning of buildings in Ozolnieki municipality" have been studied; on behalf of the magazine "Būvinženieris", "Digitization of the construction process in the construction information system" and "Impact of the emergency situation on the construction industry" have been studied.
Doctoral study programme Civil Engineering	

Type of students' involvement in research and artistic creation	Example
All study courses of the study programme are based on the development of research work and a doctoral thesis.	The study programme includes research study courses (Research methodology, Research planning and data analysis, Research), within which work is being done on the research for the dissertation
Involvement in research projects within the LLU internal grant program "Strengthening of scientific capacity at LLU"	Using the LLU internal grant program, doctoral students have worked on research projects "Analysis of the effect of graphene and steel short fibers on the stiffness of curved reinforced concrete structures" and "Methodology for determining the torsional stiffness modulus of momentary joints of wooden elements with mechanical joints".
Involvement in research , projects and contract work of VBF Department of Architecture and Civil Engineering and Building Structures	For example, several doctoral students were involved in the ERAF project "Development of new composite building materials based on foam gypsum with fiber plant reinforcement and systems made from them". Also in contract work with companies in the field, for example in contract work with the company AS UPB (No. 3.2.2.-9/28) a new doctoral student was engaged, who solves the issues of joints of prefabricated reinforced concrete structures within the framework of their doctoral theses. The doctoral student is also an academic staff member of the programme.
Professional Bachelor's study programme Land Management and Surveying	
The study programme includes separate research study courses , within which research work is developed, as well as a diploma project , which includes both the research and creative part.	The study programme includes research courses (Scientific work in specialty; Basics of scientific work) and Diploma project in specialty.
Within the framework of separate term papers , students work on both the research and the creative part in developing projects.	The study programme includes several course works that also include the research and creative part in developing projects (Spatial planning; Land use planning; Engineering geodesy and topographic surveying, etc.)
Development of the research work in cooperation with industry companies and local governments within the framework of study courses	Research work using remote sensing technologies

Type of students' involvement in research and artistic creation	Example
Participation in local and international projects implemented by VBF	For example, involvement of students in the Interreg Latvia-Lithuania Program 2014-2020 cross-border cooperation project "Creation of Joint GI Education to Increase Job Opportunities in the Region", promoting the use of ArcGIS tools in research, planning and management
Academic Bachelor's study programme Landscape Architecture and Planning	
The study programme includes separate research study courses , within which research work is developed, as well as a Bachelor's thesis , which includes both the research and creative part.	The study programme includes research study courses Landscape architecture research presentation and Bachelor's thesis
Within the framework of separate study papers , students work on both the research and the creative part in developing projects.	<p>The study programme includes several study works, which also include a research part and a creative part in developing projects (History of the Art of Architecture and Landscape Architecture; Nature Territories; Parks and Squares; Territories of Private Houses; Territories of Public Buildings; Territories of Residential Quarters, etc.). Within the framework of these courses, in cooperation with industry companies, local governments, private partners, projects are developed that are closely related to artistic creativity. For example, Riga (Anniņmuiža territory development, improvement proposal), Krimulda, Skrunda (quarter development concept), Ventspils (course projects for different territories), Jēkabpils (improvement project proposals), etc.</p> <p>Cooperation with local governments, local government structures and other organizations in the development of study course projects - Dobeļe City Council, Riga Planning Region, Zemgale Planning Region, Union of Construction Engineers, Latvian Landscape Architects Association, Jelgava City Council, Jelgava Municipality Council, Mārupe Municipality Council, Dricāni Secondary School, etc.</p>

Type of students' involvement in research and artistic creation	Example
Development of the research work in cooperation with industry companies and local governments within the framework of study courses	<p>For example, cooperation with the Riga City Municipal Agency Architect's Office, conducting research and creating development proposals for Aldara Park, Riga; in cooperation with the representatives of the Big Cleanup "Pagalmu konkurss", involving the students of the landscape architecture and planning programme in the development and implementation of yard concepts</p>
Summer schools, plein airs and other extracurricular activities	<p>For example, students participated with their works in the creative event "Flower Ball 2013" organized by the Botanical Garden of the University of Latvia; in the events organized by the Big Cleanup for arrangement and improvement of courtyards; in the development and creation of Jelgava city festival design. They also participate in the annual plein air of Latvian Schools of Architecture, which is organized in cooperation with other schools of architecture - RTU Faculty of Architecture and Urban Planning, Riga Construction College, RISEBA University of Applied Arts.</p> <p>Research and creative work is also part of the activities of the annual international summer schools. Students participated in several summer schools - W-scape (2016); Daugava River. Visible. Invisible (2015); Re-feeling City Landscape. Riga (2014); Local Landscape via Ecology, Art and Mystic (2013).</p>
Participation in local and international projects implemented by VBF	<p>For example, within the framework of the project "Sustainable use of water resources for tourism development in the Latvian-Russian border towns - Rēzekne and Ostrov (Sticky urban areas)", students of landscape architecture and planning carried out research of Rēzekne landscape from the social point of view. In turn, in the course of the Interreg Latvia-Lithuania Programme "Sustainable Integration of Novel Solutions into Cultural Heritage Sites / NovelForHeritage", students developed concepts and environmental objects for the revitalization of cultural and historical parks (in Latvia and Lithuania) and for the promotion of tourism development.</p>

Type of students' involvement in research and artistic creation	Example
Professional Master's Study Programme Landscape Architecture and Planning	
The study programme includes separate research study courses , within which research work is developed, as well as a Master's thesis , which includes both the research and creative part.	The study programme includes research study courses (Fundamentals of Research Papers; Internship (research practice)) and Master's Thesis. Within the framework of research study courses, work is being done on the development of the research part of the Master's thesis.
Within the framework of separate study papers , students work on both the research and the creative part in developing projects.	The study programme includes several study works, which also include the research and creativity part in developing projects (Sustainable Landscape Development; Territorial Development Planning; Industrial Territory Design; Greenery Concepts). For example, students develop a concept of greenery for the city of Jelgava, a vision for the revitalization of the industrial territory in the city of Dobeles, etc.
Development of the research work in cooperation with industry companies and local governments within the framework of study courses	Research work on integrated nature resources urban planning for tourism development in the study course Greenery Design Concepts and in cooperation with Rezekne City Municipality.
Participation in local and international projects implemented by VBF	For example, within the Interreg Latvia – Lithuania Programme 2014–2020 project “Innovative brownfield regeneration for sustainable development of cross-border region ”, Master’s students conducted research and developed visions for the revitalization of the territory of the former Ludza flax factory.
Doctoral study programme Landscape Architecture	
All study courses of the study programme are based on the development of research work and a doctoral thesis .	The study programme includes research study courses (Research methodology, Research methodology in landscape architecture, Research), within which work is being done on the research for the dissertation
Involvement in research projects within the LLU internal grant programme “Strengthening of scientific capacity at LLU”	Using the LLU internal grant programme, doctoral students have worked on research projects “ Road landscape modeling” “Industrial heritage landscape on the West coast of the Baltic Sea in Latvia”.

Type of students' involvement in research and artistic creation	Example
Participation in local and international projects implemented by VBF	Doctoral students are involved in almost all research projects implemented at the department. One of the most significant, with the greatest added value in the development of Latvian landscape policy is the project of the State Research Programme "Sustainable Management of Land Resources and Landscapes: Assessment of Challenges, Methodological Solutions and Proposals", which involves doctoral and Master's students.

The **results of students' research work are prepared as publications or summaries and presented:**

- Scientific-practical conference of civil engineering students and Master's students, in the framework of which the theses of the research works were published https://llufb.llu.lv/conference/student/VBF_stud_zinat_konf_tezes_buvnieciba-2020.pdf (in Latvian))
- Conference "Student on the way to science", within which summaries of research works of land management and surveying students are published <http://www.vbf.llu.lv/lv/students-cela-uz-zinatni> (in Latvian)
- Scientific conference of landscape architecture students
- Annual international scientific conference "Students on Their Way to Science" (<https://www.sws.llu.lv/>). A collection of conference proceedings is published electronically (<https://www.sws.llu.lv/proceedings>).

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.

Taking into account the growing competition in the education market, the declining demographic situation and the constantly changing approaches and settings in higher education in Latvia, one of the biggest challenges is attracting students and maintaining their interest in studies. To address this, innovative approaches are being sought both in marketing activities and in the study process.

It is important for today's young people to be aware of the role and place of their future profession in the overall economy. Therefore, the study programmes of the study direction see these **innovative approaches in close connection with practice and work-based higher education**. In order to implement it, the study direction constantly maintains close ties with industry companies and non-governmental organizations.

The following activities are implemented in **attracting students:**

- Prospective students are encouraged to have a real understanding of their future profession.

For example, in cooperation with the construction industry, the **campaign “Learn construction”** has been implemented for several years, within the framework of which guest lectures of representatives of the industry companies in schools, field seminars, study tours, traveling exhibitions take place. Thus popularizing the various professions in the construction industry and the education required to obtain them.

- In order to encourage young people to obtain higher education in the study direction, there is cooperation with vocational secondary schools, technical schools and colleges. By concluding cooperation agreements, which envisage the **admission of the most successful students to the programmes of the study direction outside the competition**, young people are motivated and encouraged to study at LLU. Such cooperation agreements have been concluded with Jelgava Technical School, Saldus Technical School, Bulduri Horticultural Secondary School (appendix No. 6).
- In cooperation with secondary schools and technical schools, young people have already been given the opportunity to **get acquainted with the study programmes of the study direction and study environment** during school. For example, 10th and 11th grade students of Jelgava Secondary School of Technology visit the faculty every two weeks and perform laboratory work related to various branches of environmental and material sciences. The students of Bulduri Horticultural Secondary School go to the study building of Valdeka Castle, where they get acquainted with the study environment of landscape architects and participate in trainings led by the academic staff members of the study direction.

To maintain the interest of the existing studies to continue their studies, the following activities are implemented:

- **Connection with the profession in the early stages** of studies, including professional study courses already in the 1st year, integrating general study courses (mathematics, physics, etc.) into professional study courses, for example, the study course Land Surveying integrates mathematics module that is relevant to the profession. In this way, students become more interested in the specific profession and gain an understanding of the role of the science subjects in the chosen profession. This increases the motivation to learn science subjects and reduces the risks of dropping out.
- **Close connection with the profession** within the study courses, solving real situations, presentation to the involved parties. For example, the work of the students on the research and planning / project development for a specific location or site, presentation of the project to the municipality, industry etc. representatives.
- **Involvement of students in research**, which increases the interest to continue studies in Master's and doctoral studies.
- **Project-oriented studies and promotion of creativity** by working on real projects, involving students in creative plain airs.

Innovations also enter the study process with the **development of information technologies in both the industry and education**. The development of study and science infrastructure and approaches is also important.

- IT solutions are actively used in the programmes of the study direction. For example, 3D models and scenarios are developed, the latest industry software is mastered to implement BIM into the study process, also the GIS technology is actively used. Modern computer classrooms and GIS Competence Centre has been developed.
- E-learning environment tools (interactive testing and self-assessment tools, online lectures and consultations, etc.) are also actively used, which was especially important during the Covid19 pandemic, when the distance learning process was implemented.

The future plans of the study direction are related to the **development of innovative outdoor laboratories**, which would allow testing various solutions in Latvian weather conditions (building enclosing elements, green roofs, rain gardens, etc.).

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.

Within the study field, there is active cooperation with various Latvian and international institutions, which is aimed at achieving the goals of the study direction and study results. The goals of the study direction are related to high quality studies and life-long education opportunities in the professional areas of the study direction. Cooperation with employers, professional organizations and state institutions (including ministries and local governments) is essential for achieving this goal. The goals of the study direction are also aimed at the integration of studies and research, scientific succession and transfer of innovations in the national economy. Here, too, co-operation with companies in the field is important, as well as co-operation with other Latvian and foreign scientific and academic institutions. Cooperation with foreign partners is in line with the goal of the study direction, which is aimed at the internationalization and recognition.

Cooperation with companies and organizations of the architecture and construction field (pre-diploma traineeships, research contracts with student involvement, etc.) also forms the recognition of LLU Architecture and Civil Engineering study programs, promoting the fast integration of programme graduates into the labor market. Often employers are also graduates of LLU study programs, who know the quality of study programmes offered by LLU, as well as there is still a lack of specialists in the field of architecture and construction, thus additional separate mechanisms for attracting employers are not necessary.

The main cooperation partners and activities are described below:

Cooperation with other Latvian universities, LLU faculties and structural units:

- **Organization of conferences, review of scientific publication of the conferences**
 - VBF academic staff members cooperated with the **Technical Faculty of LLU** in reviewing scientific articles for the collection of articles of the 19th International Scientific Conference "Engineering for Rural Development".
 - Cooperation with **RTU Faculty of Architecture and Urban Planning** teaching staff in reviewing scientific articles for the publications of the scientific journal "Landscape Architecture and Art"
- **Cooperation in final work commissions and evaluation, assessment of the study process**

- **RTU Faculty of Civil Engineering, Department of Geomatics** and **LU Institute of Geodesy and Geoinformatics** staff is invited to sit on the state examination commission and act as members of thesis commissions and thesis supervisors in the professional Bachelor's study programme "Land Management and Surveying".
- Cooperation with **RISEBA and RTU in the evaluation of final theses in the field of architecture.**
- Participation of VBF lecturers in the final thesis commission at **Riga Construction College.**
- Teachers of civil engineering study programmes cooperate with **RTU BIF** and **IEVF, RCK** and **RTA** lecturers in Latvian Construction Council, LBS board, LBS Education and Science section, LSGŪTIS, as well as participate in scientific conferences organized by RTU and LLU and LBS LBA practical industry conferences and seminars
- **Organizing the study process and other study activities, including plein airs**
- Cooperation agreement with **RTU** on the possibility to continue study programmes, if the existing programmes of LLU are no longer continued
- Within the framework of the study course "Global Positioning", an excursion has been organized for 3rd year students to St. Peter's Church in Riga, where there one of the two starting points or zero points of the Riga Geodetic Network is located (the other is on the roof of the **University of Latvia**). These points used to be a reference point for measuring the territory of Latvia.
- Trips to the Satellite Observation Station of the Institute of Astronomy of the University of Latvia, which is located in the territory of the Botanical Garden of the University of Latvia; Ventspils Radio Astronomy Centre in the territory of which the G0 point of the Latvia geodetic support system is located.
- Cooperation with **RISEBA, RTU Faculty of Civil Engineering** to provide guest lectures on specific topics (for example, Structural Dynamics).
- cooperation with **the University of Liepaja**, reading and conducting the study course "Environmental Design / Landscape Architecture" in the professional Master's study programme "Ecotechnology" for Latvian and ERASMUS+ students
- Organization of the annual Latvian School of Architecture plein air in cooperation with **RTU, RCK** and **RISEBA.**
- **Development and strengthening of succession in the branch education. Attracting new students**
- Succession of studies within the framework of cooperation with **Riga Construction College, Rēzekne Academy of Technology, Vidzeme University College** - graduates of the 1st level higher professional education study programme Civil Engineering have an opportunity to continue / start studies in senior courses in LLU professional Bachelor's study programme Civil Engineering.
- Cooperation with **Saldus Technical School, Bulduri Horticultural Secondary School, Jelgava Technical School** on the admission of the most successful students of the technical school for studies at the LLU Civil Engineering and Landscape Architecture and Planning programmes outside the competition, if they have fulfilled the requirements of the cooperation agreement.
- **Participation in doctoral and professor councils**
- Mutual cooperation between LLU and **RTU Faculty of Civil Engineering** in the work of Civil Engineering Promotion Councils.
- Cooperation with **RTU Faculty of Architecture and Urban Planning.** Representatives of both universities are members of the joint RTU and LLU Architecture Professors' Council, RTU Architecture Promotion Council and LLU Landscape Architecture Promotion Council
- **Research work**

- Cooperation in research work with the **University of Latvia, Faculty of Geography and Earth Sciences, Environmental Quality and Monitoring Laboratory** - sound absorption measurements of organic materials.
- Cooperation with **RTU** in research work.
- Cooperation with the **Technical Faculty of LLU, Forest Faculty of LLU** and the **Department of Physics of the ITF** in scientific projects and research work of doctoral students.
- Cooperation with **LLU Forest and Water Resources Scientific Laboratory, Forest Faculty** and **Land Management and Geodesy Department** of the Faculty of Environment and Civil Engineering in project implementation, development of scientific publications, research (Interreg Latvia - Lithuania cross-border cooperation projects, Latvia-Russia cross-border cooperation project).

Several activities are implemented in cooperation with the industry and municipalities

- **Provision of study and undergraduate internships** (list of traineeships places is attached in appendix 8). In total, **125 companies in Latvia and 31 abroad** have provided internships. Participation of industry companies in the **Internship Day**
- In the implementation of course papers and **course project topics, creative plein airs and other activities**, offering to solve specific issues or work on specific sites (Gulbene municipality, Jelgava municipality, Rēzekne city, company "Rīgas Meži", Riga Municipal Agency Riga City Architect's Office, etc.).
- **An average of 80 specialists** from industry companies and organizations are involved in the **final work evaluation commissions and theses review every year**.
- Providing of **study tours**.
- **Guest lectures** on current topics in the industry - **20-30 guest lecturers** every year.
- **lectures and seminars by academic staff members for specialists of municipal and industry companies** (on average 20 academic staff members every year).
- Cooperation with **professional organizations in the field** - Latvian Association of Landscape Architects, Latvian Union of Civil Engineers, Latvian Association of Builders, Latvian Surveyors Association and others in the organization of guest lectures and seminars, improvement of the study process, etc.
- Cooperation with Latvian municipalities and companies in the **development and implementation of international project applications** (Latvian-Lithuanian, Latvian-Russian cross-border cooperation projects, practical projects, etc.) - Ludza municipality, Rēzekne municipality, Jelgava municipality, etc.
- Cooperation with the **organizers of the Big Cleanup "Pagalmu konkurss"**, SIA Road construction company "Igate" on the improvement of courtyards in Jelgava and Riga.
- with **the Ministry of Economics and industry organizations**, other educational and scientific institutions on the implementation of BIM in the construction industry in Latvia.

The following activities were implemented in cooperation with graduates:

- Graduates are involved in the **evaluation of final theses** both as members of the commission and as reviewers.
- Graduates participate with **guest lectures on current events in the field** within the framework of several study courses.
- Graduates provide study tours and internships in the industry companies and municipalities.
- Graduates participate in the process of **improvement of the study programme** by participating in surveys and working discussions; Within the framework of the ESF project "Improvement of the management of LLU" No. 8.2.3.0/18/A/009, industry experts - graduates were involved in the **evaluation of study programmes**.

- With the **support of graduates, teaching aids are published, the industry and industry education is popularized.**

International sectoral organizations and networks

- **European Academy of Land Use and Development (EALD)**
- **International Association for Bridge and Structural Engineering (IABSE).**
- **Green Economics Institute** England, Oxford, GEI.
- **NJF** (Nordic Association of Agricultural Scientists).
- **ECLAS** - (European Council of Landscape Architecture Schools) - Council of European Schools of Landscape Architecture
- **Baltic Landscape Architecture School Network (EBANELAS).** Representatives from Lithuanian, Estonian, Latvian, Swedish and Finnish universities. The network was established in 2012 with the aim of working on improving and harmonizing landscape architecture education with the landscape architecture education standard developed by the Council of European Schools of Landscape Architecture (ECLAS).
- **IFLA** (International Federation for Landscape Architecture) - World Federation of Landscape Architects
- **NORDNATUR** network
- **Nordic Landscape Research** network
- **"Herity"** Network (International Heritage Quality Management Assessment)
- **ICOMOS** - International Council on Monuments and Sites.

Cooperation between foreign universities and academic staff members

- Cooperation in research, preparation of joint publications, conducting guest lectures, workshops, consultations, review of scientific articles, work in committees of journals and article collections (Baltic Surveying, International Scientific Conference Engineering for Rural Development, Landscape, ICOSADOS) with: John Moores University, Liverpool, United Kingdom ; Armenian State Agrarian University, Faculty of Hydromelioration, Land Management and Land Cadastre; Lancaran State University, Azerbaijan, Department of Finance, Accounting and Auditing; Belarusian State Academy of Agriculture; Belarusian Republican Company "Design Institute" Belgiprozem ""; Belarus State University; Belarus State University of Agricultural Technology; Belarus State University of Technology; GeoInTech, a Belarusian research and development company; Czech Research Institute of Geodesy, Topography and Cartography; Aalborg University in Denmark, Department of Development and Planning, Polytechnic University of Bari in Italy, Department of Construction, Environment, Civil Engineering and Chemistry; Estonian University of Life Sciences; Koksheta State University of Kazakhstan; Kazakhstan National Agrarian University; Russian State University of Land Management; Samara State University of Economics, Russia; Department of General Geology and Land Management, Tomsk Polytechnic University; Samara State University of Agriculture, Faculty of Economics; Institute of Land Management and Geomatics, Vytautas Magnus University; Department of Geodesy, Klaipeda State University of Applied Sciences; Kaunas University of Applied Sciences of Forest and Environmental Engineering; Kaunas College, Faculty of Landscape Architecture; Moldovan State Agrarian University; Wroclaw University of Environmental and Life Sciences; Warmian-Masurian University of Olsztyn, Department of Planning and Spatial Engineering; University of Science and Technology in Poland, Department of Geomatics; Department of Land Management and Landscape Architecture, Krakow University of Agriculture; Faculty of Civil Engineering and Geodesy, Warsaw University of Military Technology; Pitesti University; Department of Geoinformatics and Real Estate Cadastre, University of Ljubljana; Department of Surveying, Bratislava University of Technology; Department of Land Management,

Shirinshon Shohtemur Agrarian University, Tajikistan; National University "Lvivska Polytechnika"; Faculty of Land Management, Lviv National Agricultural University; Uzhhorod National University; Department of Land Management, National University of Life and Environmental Sciences, Ukraine; Department of Land Management and Cadastre, Kiev National University of Construction and Architecture; Department of Land Management and Cadastre, National Agrarian University of Kharkiv V.Dokchayev; Department of International Relations, Tashkent Institute of Architectural Construction;

- Cooperation in research, preparation of joint publications, conducting guest lectures, workshops, consultations, review of scientific articles, activities in journals and collections committees. Cooperation with **the University of Trás-os-Montes e Alto Douro (UTAD) Portugal** and **Wrocław University of Environmental and Life Sciences in Poland**, LLU Civil Engineering study programme in organization of the international scientific conference ICOSADOS and review of scientific articles, as well as organization and management of students' summer school.
- Cooperation between the civil engineering programme and the Engineering College of Copenhagen in Denmark, Edinburgh Napier University in Scotland, Lyon Technical University (IUT A Université Claude Bernard, Lyon) in France, Amsterdam University of Applied Sciences in the Netherlands, Burgos University in Burgos in Spain in the organization of **EPW (European Project Week)**.
- Cooperation with the **University of Maribor** (Slovenia), the **University of Tartu** (Estonia) in guest professorship, conducting guest lectures, organization of seminars, review of scientific articles.
- Cooperation with the **Estonian University of Life Sciences** (EMU) in conducting guest lectures, workshops, consultations, review of scientific articles, evaluation of study programmes within the framework of the ESF project.
- Cooperation with **the Department of Urban Planning at Vilnius Gediminas Technical University**. Review of scientific articles for the scientific collection of articles "Science – Future of Lithuania" (www.mla.vgtu.lt, ISSN 2029-2341 print / ISSN 2029-2252 online).
- Cooperation with **Vytautas Magnus University** (Lithuania) in organization of study activities.
- Cooperation in research and review of scientific articles with the professionals of the **University of Agriculture of Sweden, St. Petersburg State Forest Technical University, Neubrandenburg**
- Cooperation with **Neubrandenburg** University in the work of the doctoral council and review of doctoral theses.
- Cooperation with the **Norwegian University of Life Sciences**. Review of scientific articles for the scientific journal "Landscape Architecture and Art" (http://llufb.llu.lv/Raksti/Landscape_Architecture_Art/index.html, ISSN 2255-8632 print / ISSN 2255-8640 online).
- Cooperation with **Kaunas Forestry and Environmental Engineering at the University of Applied Sciences** lecturers in organization of guest lectures, workshops.

In 2015, **the LLU Internationalization Plan** was developed, which determines the goals, priorities and performance indicators of the university's international cooperation in the fields of exchange studies, full-time studies of foreigners and living conditions of foreigners.

- The plan determines priority cooperation with higher education institutions with a similar study and research profile in the EU member states and partner countries, whose study directions correspond to those implemented by LLU.
- The plan envisages priority co-operation with international university associations, where LLU is an active member - the European Association of Life Sciences Universities (ICA), Baltic

University Program (BUP), Baltic and Nordic Agricultural University Network (BOVA - NOVA), Nordic Association of Agricultural Scientists (NJF), etc., and who carry out their academic activities in similar fields of study and research.

- As the offer of international cooperation from foreign universities is extensive, LLU focuses its activities on those partners with whom such cooperation is long-lasting and productive. Also, at the level of study directions of LLU, there are foreign partner universities or their faculties, with which there is a regular exchange of students and lecturers (Erasmus+ programme, etc.), participation in joint projects both in studies (for example, SO 8.2.3.) and research, mutual participation in research and methodological conferences, etc.

The general cooperation agreements / memoranda concluded by LLU are presented in *the Appendix No.6*, but the higher education institutions with which Erasmus+ interinstitutional agreements have been concluded are listed here: https://www.llu.lv/sites/default/files/2018-10/LLU%20ligumi%20_Erasmus%20partneraugskskolas_HEIs%2027.03.18.xls

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.

The **attraction of foreign students** can be assessed in two directions - foreign students in study programmes and foreign students within the framework of various international activities and mobility programmes. During the reporting period, foreign students studied in three programmes of the study direction - academic Bachelor's and professional Master's study programmes Landscape Architecture and Planning (2 students in undergraduate studies and 2 students in Master's studies) and in the doctoral study programme Civil Engineering (1 doctoral student). Information added also in the *Appendix No. 11*. The small number of students can be explained by the fact that the implementation of programmes in English has started relatively recently. In the accreditation process, it is planned to make changes in 3 study programmes, envisaging their implementation also in English.

In order to attract foreign students, LLU, first of all, provides information about its offer, which can be found on the websites (see the section *Availability of information about the study direction*). In order to attract foreign students, LLU implements various marketing activities: agreements are concluded with recruitment agents, providing efficient evaluation of their work, e-marketing, participation in international education fairs and agent forums, etc. LLU is a member of the Latvian Higher Education Export Association (AIEA) and participates in the activities it organizes.

In order to ensure the inclusion of the latest industry knowledge and current events in the study process, **guest lecturers from foreign universities** are invited. Foreign guest lecturers are invited within the framework of specific topics or international activities. Thus, for example, by inviting foreign guest lecturers, several thematic, intensive training courses for Master's and doctoral students and academic staff members have been organized in the study period within the **BOVA** (Baltic Forestry, Veterinary and Agricultural University Network) programme. Foreign guest lecturers are also involved in **international summer schools**. Every academic year, as far as possible, **foreign guest lecturers are engaged on the basis of an employment contract** in the branches of the study direction, including from the own resources (tuition fees) of the Faculty of Environment and Civil Engineering. For example, since the 2016/2017 academic year, close

cooperation has been established with Professor Simon Bell of the Estonian University of Life Sciences and the University of Edinburgh (H-index in Scopus 20). Cooperation with Professor S.Bell is very important because he has been involved in important projects, which are also related to the study of Latvian landscapes, as well as several current issues. The professor has been president of the Council of European Schools of Landscape Architecture (ECLAS), thus also strengthening the international recognition of the specialty of landscape architecture at the LLU and cooperation with foreign landscape architecture schools. In total, during the reporting period, 13 agreements were concluded with foreign academic staff from 8 countries (Estonia, Sweden, Norway, Slovenia, Lithuania, Estonia, Poland, Ukraine). Information on foreign students in the programs and visiting professors with whom agreements on lectures and program improvement activities were concluded in the reporting period is attached in *the Appendix 11 Statistics on Foreign Students and Teaching Staff in the Reporting Period*. Information on the teaching staff involved in all international activities is attached in *the Appendix 13 Outgoing and incoming mobility of academic staff*.

Attracting foreign students and lecturers within the framework of other international activities and mobility programmes during the reporting period has taken place:

- From funds of the Faculty of Environment and Civil Engineering
- In the framework of ERASMUS + and NordPlus mobility programme
- Kazakhstan mobility programmes
- Within the framework of BOVA (Baltic Forestry, Veterinary and Agricultural University Network) international study courses: Landscape regeneration of degraded areas (2018); Landscape Cognition (2015); Landscape Ideology (2015); Modern Technologies in Determination of Geodic Height System (2015); Landscape Studio (2014); etc.
- Within the framework of the International Summer Schools in Landscape Architecture (W-scape (2016); Daugava River. Visible. Invisible (2015); Re-feeling City Landscape. Riga (2014); Local Landscape via Ecology, Art and Mystic (2013))
- Within the framework of the International Summer Schools in Civil engineering (2019).
- Within the framework of the EU programme project "Improvement of LLU academic staff" implemented by LLU.

In total, during the reporting period, **63 foreign lecturers from 19 countries** (Great Britain, Belgium, Germany, Switzerland, Poland, Ukraine, Romania, Slovenia, Czech Republic, USA, Switzerland, Hungary, Estonia, Norway, Lithuania, Sweden, Turkey, Kazakhstan, Finland) and **231 students** from 18 countries (Italy, Kazakhstan, Belarus, Iceland, Estonia, Lithuania, Estonia, Finland, Slovakia, Azerbaijan, Uzbekistan, Spain, Germany, France, Russia, Ukraine, Turkey, Sweden). In turn, 144 students (95 in study mobility and 52 in traineeship) went to foreign higher education institutions or companies (in traineeship). As part of various other activities, 183 students went abroad for mobility. More detailed information on the incoming and outgoing mobility of students in the field of study is attached in *Appendix 14*.

Both the **content of study programmes** and their **correspondence to a wider geographical location** (not only narrowly to the Latvian situation) and the **overall competition in the specific thematic group of study programmes** play an important role in attracting foreign students and lecturers. Therefore, when starting to implement study programmes in English, possible regions that would be interested in the study programmes of the study direction have been identified. For example, the direction of land use planning and management is of interest to Kazakh students, while the direction of landscape architecture and planning is attractive to the Russian market. Study programmes that would be attractive to foreign students, such as doctoral programmes, as well as programmes in landscape architecture and planning, land management and surveying, have also been evaluated, as these fields are relatively underrepresented in the education market and may be attractive to students. Therefore, the accreditation process includes changes in the

doctoral programmes and the Bachelor's programme in land management and surveying, envisaging that they will also be implemented in English. The implementation of the Bachelor's and Master's study programmes in landscape architecture and planning in English was already approved in the programmes amendments in 2017.

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 study programmes of the study direction Architecture and Civil Engineering include **study, research, professional and pedagogical internships** in accordance with the aims and tasks of the programmes. LLU internships are implemented in accordance with Latvian education normative documents and LLU Traineeship Regulations (<https://www.llu.lv/lv/studiju-prakses> (in Latvian) and *Appendix No.17* (in English)) and other LLU internal normative documents.

The aim of the internship is to give students the opportunity to strengthen their theoretical knowledge, to acquire the competence corresponding to the study programme, as well as to give the student the opportunity to obtain the information necessary for the development of the diploma project. Internship programmes are developed for each internship included in the programmes. The **practical training** takes place within the specific study course. Students are assigned to the practical training by the order of the Dean of the Faculty, and the student performs the tasks specified in the practical training programme under the direct supervision of the lecturer. Before the practical training takes place, the students are given labour safety instructions for which they sign in the Labour Safety Logbook. The instruction is given by the person in charge of labour protection and fire safety of the relevant department / institute. **Research practice** plays an important role in professional Master's study programmes. Research practice is related to the topic of the Master's thesis. In turn, the doctoral program Landscape Architecture includes **pedagogical practice**. Pedagogical practice is implemented by teaching classes in the Bachelor's and Master's study programmes of landscape architecture and planning under the guidance of an experienced supervisor.

Professional internships in the study direction Architecture and Civil Engineering are included in the following professional programmes: 1st level professional higher education study programme Civil Engineering, professional Bachelor's study programme Civil Engineering, professional Master's study programme Civil Engineering, professional Bachelor's study programme Land Management and Surveying, professional Master's study programme Landscape Architecture and Planning. Pedagogical practice is included in the doctoral study programme Landscape Architecture and is implemented in the Bachelor's and Master's study programmes Landscape Architecture and Planning.

Professional internship is implemented in accordance **with the internship agreement, which LLU concludes with the internship provider and the student**. Professional internships are organized within the study programme for the students to understand the application of theoretical knowledge in practice. During the internship, the student prepares an internship report, which is submitted to the internship supervisor after the end of the internship, together with the reference of the internship provider. The student defends the internship report within the deadlines specified in the semester plan before the internship defense commission established by the department

overseeing the programme.

Taking into account the high demand of specialists in the study direction, the availability of professional internships places has been well ensured so far. The exception is 2019/2020 and the 2020/2021 academic years, when the provision of internships was slightly more difficult due to the constraints of the Covid 19 pandemic (e.g. restrictions on fieldwork and restrictions on assembly affected interns' job opportunities in companies and facilities). Due to the high demand, most students start working in industry companies already in the second year, in parallel with their studies. Often they also choose these companies as internships in later courses.

In order to promote cooperation between students and companies in the field, a **Practice Day** in the field of landscape architecture and planning is organized. During the Practice Day, students meet with representatives of industry companies, who present the areas of activity of their companies, communicate with students and agree on internship opportunities with the potential interns. The Practice Day is actively used by companies, on average every year 10 companies in the sector participate in it.

In the field of civil engineering and land use planning and surveying, **communication with industry companies about providing internships takes place during joint meetings** - study tours to industry companies, guest lectures, joint work in various industry commissions (for example, Latvian Association of Civil Engineers, Latvian Surveyors Association, etc.).

Both **cooperation agreements and letters of intent / agreements on the provision of internship places** have been concluded regarding the internship opportunities for the study direction (*Appendix No.8*). In total, contracts have been concluded with 58 companies, municipalities in Latvia, but within the internship agreement, which LLU concludes with the internship provider and the student, students completed their internship in more than 125 companies in Latvia.

Students also have the opportunity to **complete their internships in the framework of the ERASMUS+ and DBU (Germany) programme**, which is more actively used by students of the civil engineering programme, as several Latvian companies are active abroad. Also, students of landscape architecture and planning programmes actively complete their internship in foreign companies both during their studies and immediately after their studies (for example, in the DBU programme). The LLU Centre for International Cooperation provides funding for Erasmus+ mobility projects on the basis of individual agreements. ERASMUS+ programme opportunities for internships abroad are also used by foreign students. In total, during the reporting period students of the study direction completed their internship in 31 company in 12 European countries (Poland, Spain, Germany, Finland, Portugal, Sweden, Norway, Italy, The Netherlands, UK, Estonia, Denmark).

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.

Taking into account the specifics and uniqueness of the study programmes Architecture and Civil Engineering provided by LLU in the Latvian context, the development of joint study programmes with other Latvian higher education institutions is not currently planned. Possibilities to create joint study programmes with the partner universities of the consortium of LLU universities established in 2020 - Daugavpils University and Liepāja University are being considered. Foreign (Icelandic, Dutch, Russian) universities have expressed interest in developing joint study programmes in the field of landscape architecture and planning. However, a significant obstacle here is the differences between national education systems and the organization of study programmes.

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 academic year of 2011/2012, the LLU study direction Architecture and Civil Engineering and its study programmes were assessed by international experts in the framework of the European Social Fund's Project "Evaluation of Higher Education Programmes and Suggestions for Quality Improvement", Agreement No.2011/0012/1DP/1.1.2.2.1/11/IPIA/ VIAA/001. 12 study programmes were evaluated. According to experts, study programmes at all levels of the landscape architecture sub-direction were included in group one and considered sustainable. According to experts, the study programmes of all levels in construction, civil engineering and hydraulic engineering sub-fields, as well as professional Bachelor's and academic Master's study programmes of land management sub-field were included into the group two and are considered to require certain improvements. Since the expert evaluation, **the suggestions and recommendations of the experts have been taken into account and significant improvements have been made for the programmes** of the second group, including - several study programmes were closed and new programmes were licensed instead. For example, the 1st level professional higher education programme Land management, according to the experts, was included in group three and considered to be a programme of questionable usefulness. Therefore, taking into account the recommendations of experts, the admission of new students to this programme has not taken place since 2013 and the programme is closed. Experts also pointed to the fragmentation of doctoral programmes in doctoral studies in the fields of civil engineering and hydro engineering. Currently, the doctoral programme Hydroengineering is combined with the doctoral programme Environmental Engineering, instead of two programmes, a new programme Environmental Engineering in the study direction of Environmental Protection has been created and licensed, which is also implemented by the Faculty of Environment and Civil Engineering.

The experts' recommendations also pointed to the need to establish cooperation with other Latvian and foreign higher education institutions and to be more active in research, linking it with the study process. During the reporting period, the staff involved in the study direction has significantly increased their research activities by implementing international (e.g. cross-border cooperation

projects) and nationally important research projects (e.g. National Research Programme project), published research results in scientific journals indexed in Scopus and WoS databases. Within the framework of projects, as well as other international activities (intensive study courses, international summer schools, organization of international conferences, review of scientific articles), cooperation with foreign higher education institutions also takes place. Cooperation with Latvian higher education institutions has also been strengthened, for example, a joint LLU and RTU professors' council in the field of architecture has been established, cooperation agreements have been concluded on the opportunity for the graduates of the 1st level professional higher education study programmes of other universities to start studying at the LLU professional Bachelor's study programme Civil Engineering at a later course, thus, obtaining the qualification of a civil engineer in a shorter period of time. In the previous reporting period, experts had identified the need for reducing the average age of the academic staff, that is vital for the sustainable development of LLU. Since 2013, 55 (51% of all academic staff) academic staff members under the age of 45 have been attracted to the study direction, promoting generational change. The experts' recommendations also included the need to improve the English language skills of academic staff and the attraction of international academic staff. Foreign academic staff members are engaged every study year, using both the funding available to the VBF and the opportunities of various programmes (ERASMUS +, NordPlus, BOVA network, Swiss grant, etc.). Currently, the work continues to attract foreign researchers. In turn, The academic staff members have improved their English language skills within several activities: English language courses for LLU employees organized by the LLU Language Centre, several lecturers have done internships abroad or participated in international programmes or seminars, ERASMUS+ mobility, English language courses within the EU project "Improvement of LLU academic staff".

An overview of the implementation of previous recommendations provided by accreditation experts is attached in the *Appendix No.9*.

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, three new programmes were licensed in the study direction Architecture and Civil Engineering, but significant changes were made to two more (Table 11).

Table 11

New licensed study programmes and study programmes with significant changes during the reporting period

No.	Name	Date of licensing or change	Type of studies	CP	Degree and / or qualification to be obtained
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1.	Land management and surveying, p(b)	licensed on 10.12.2014	Full time Part time	160	Professional Bachelor's Degree in Engineering in Land Management and Surveying / land management engineer
2.	Civil Engineering, (1st level)	licensed on 24.09.2014	Part time	120	- / construction manager
3.	Civil Engineering, p(m) <i>Specializations</i> - Geodesy - Building materials and constructions - Construction organization and technologies - Energy audit of buildings and energy management - Acoustics	licensed 15.05.2014.	Full time	40	Professional Master's degree in Civil Engineering
4.	Landscape architecture and planning, a(b)	changes approved by the study accreditation commission meeting decision No.50-A 29.05.2017.	Full time (in Latvian and English)	140	Bachelor of Engineering in Architecture and Urban Planning / -
5.	Landscape architecture and planning, p(m)	changes approved by the study accreditation commission meeting decision No.51-A 29.05.2017.	Full time (in Latvian and English)	80	Professional Master of Architecture in Landscape Architecture / landscape architect
			Full-time (in Latvian and English) - with already obtained qualification	40	Professional Master of Architecture in Landscape Architecture / -

- p(m) - professional Master's programme
- a(b) - academic Bachelor's study programme
- p(b) - professional Bachelor's study programme
- 1st level - First level professional higher education study programme

The experts evaluating changes in licensing and study programmes suggested the following as the **main recommendations**:

- The need to supplement the descriptions of study courses, mainly by supplementing the part of information sources, as well as specifying the aim, acquired skills, knowledge and competencies;
- The need to complement the aims and objectives of the programmes so that they form a closer link with the qualifications to be acquired;
- Promote the research work of the academic staff in connection with the implemented study courses;
- Establish and strengthen cooperation with other educational institutions;
- Plan the implementation of programmes in English;
- Improve the study and research infrastructure.

The proposed recommendations have been implemented, except in the context of the 1st level professional higher education study programme Civil Engineering, it is not possible to implement it in English, as recommended by the licensing expert. The programme is implemented only as part-time studies (initially full-time studies were also planned), it is specific and more adapted to the situation in Latvia, therefore it would not be required by foreign students.

Reports on the implementation of the expert recommendations for the licensed programmes and programmes with significant changes are attached in *the Appendix No. 9*. The identified recommendations as implemented activities (for example, changes in the parameters of study programmes, development of cooperation with various involved parties, improvement of infrastructure, development of research and its integration in the study process) are included in the report of each study program.

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.docx	1_dala_1_pielikums_Galveno_normativo_dokumentu_saraksts.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_Annex_LLU_management_structure_EN.docx	2_Pielikums_LLU_parvaldibas_shema_LV.docx
II. Description of the Study Direction - 1. Management of the Study Direction		
Plan for the development of the study direction (if applicable)	1_appendix_study_direction_development_plan_ENG.xlsx	1_piel_studiju_virziena_attistibas_plans_LV.xlsx
Management structure of the study direction	2_appendix_study_direction_management_ENG.pdf	2_piel_studiju_virziena_parvaldiba_LV.pdf
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	3_appendix_Academic_staff_list_ENG.xlsx	3_piel_macibspeku_saraksts_LV.xlsx
Biographies of the teaching staff members (in Europass Curriculum Vitae format)	4_appendix_Academic_staff_CV_ENG.zip	4_piel_Macibspeku_CV_LV.zip
Summary of the statistical data on the incoming and outgoing mobility of the teaching staff over the reporting period	13_appendix_academic_staff_incoming_outgoing_mobility_ENG.pdf	13_piel_macibspeku_ienakosa_izejosa_mobilitate_LV.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	5_appendix_Academic_staff_publications_and_list_ENG.zip	5_piel_Macibspeku_publicacijas_un_saraksts_LV.zip
II. Description of the Study Direction - 5. Cooperation and Internationalisation		
List of cooperation agreements	6_appendix_cooperation_contracts_ENG.pdf	6_piel_sadarbibas_ligumi_LV.pdf
Statistical data on the teaching staff and the students from abroad	11_appendix_foreign_students_and_academic_staff_ENG.pdf	11_piel_programmas_arvalstu_studejosie_macibspeki_LV.pdf
Statistical data on the mobility of students (by specifying the study programmes)	14_appendix_outgoing_incoming_mobility_students.pdf	14_piel_izejosa_ienakosa_mobilitate_studenti.pdf
Description of the organisation of the traineeship of the students	7_appendix_traineeship_regulation_ENG.pdf	7_pielikums_praksu_nolikums_LV.pdf
Information on the agreements and other documents confirming the traineeship of the students in companies	8_appendix_traineeship_places_contracts_ENG.pdf	8_piel_praksu_vietas_ligumi_LV.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	9_appendix_recommendations_ENG.zip	9_piel_rekomendacijas_LV.zip
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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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		
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	6_appendix_ZIM_study_courses_mapping_ENG.pdf	6_pielikums_ZIM_studiju_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)		3_studiju_plans.pdf
Descriptions of the study courses/ modules		
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.		
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 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_virziena_novertesana_Arhitektura_buvnieciba_EN_precizets.docx	IESNIEGUMS_Studiju_virziena_novertesana_Arhitektura_buvnieciba_LV_precizets.doc

Other annexes

Name of document	Document
LLU Dokumenti latviešu valodā	LLU Dokumenti latviesu valoda.zip
LLU Documents in English	LLU Documents in English.zip
10. pielikums Akadēmiskā atzīšana LLU	10_piel_Akadēmiskās atzīšanas kārtība_LV.pdf
10 Appendix Academic recognition in LLU	10_appendix_Academic Recognition at LLU_ENG.pdf
15 Appendix Regulations of the academic positions of the Latvia University of Life Sciences and Technologies	15_appendix_LLU_Regulations_on_Academic_positions_EN.pdf
17 Appendix Traineeship Regulations of LLU	17_appendix_Traineeship regulation_LLU_ENG.pdf
12. pielikums Mācībspēku īstenoto projektu saraksts	12_piel_projekti_LV.pdf
12 Appendix The list of projects implemented by the academic staff	12_appendix_projects_ENG.pdf
16 Appendix Regulations for the Development, Approval and Change of Study Programmes at LLU	16_appendix_Regulations on Study Programme Development_ENG.pdf
1_appendix_study_direction_development_plan_ENG.xlsx	1_appendix_study_direction_development_plan_ENG.xlsx
1_piel_studiju_virziena_attistibas_plans_LV.xlsx	1_piel_studiju_virziena_attistibas_plans_LV.xlsx
11_Procedure for measuring the efficiency of the scientific performance.pdf	11_Procedure for measuring the efficiency of the scientific performance.pdf
11_Zinatnes_sniegums_petnieciba.pdf	11_Zinatnes_sniegums_petnieciba.pdf
darba_plans_2019_izpilde_2020_plans.docx	darba_plans_2019_izpilde_2020_plans.docx
rekt_rik_par_ikgadejo_darba_planu_izstradi.pdf	rekt_rik_par_ikgadejo_darba_planu_izstradi.pdf
VBF_akad_person_att_aktualizets_2020_01_10.xlsx	VBF_akad_person_att_aktualizets_2020_01_10.xlsx
Study course descriptions_Land management and surveying	ZIM_Studiju_kursi_2021_pilnveidots.rar
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Landscape Architecture and Planning (47581)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Landscape Architecture and Planning</i>
Education classification code	<i>47581</i>
Type of the study programme	<i>Professional master study programme</i>
Name of the study programme director	<i>Natalja</i>
Surname of the study programme director	<i>Nitavska</i>
E-mail of the study programme director	<i>natalja.nitavska@llu.lv</i>
Title of the study programme director	<i>Dr.arch.</i>
Phone of the study programme director	
Goal of the study programme	<i>The objective of the study programme is to provide students with the set of professional knowledge and skills necessary to start practical activities in the field of landscape architecture. As specialists who are able to independently, or in working groups, perform research, analysis, development planning, preservation, restoration and management of landscapes, public and private outdoor facilities and greenery.</i>
Tasks of the study programme	<i>Acquisition of Master's level knowledge is ensured by the content of the study programme, which envisages mastering theoretical and specialized study courses, mastering the basics of research work, research methodology; acquire the necessary practical knowledge and skills in practice. To reflect the acquired theoretical and professional knowledge and practical skills in the Master's thesis.</i>
Results of the study programme	<p><i>Planned study results - Graduates of the study program:</i></p> <p><i>Knowledge:</i></p> <ul style="list-style-type: none"> <i>• are able to understand the importance of cultural and historical landscape and natural heritage in the development of the national economy.</i> <p><i>Skills:</i></p> <ul style="list-style-type: none"> <i>• are able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule;</i> <i>• are able to apply the acquired academic knowledge in solving the ecological, aesthetic and social problems of the landscape in preserving the cultural and natural heritage and ensuring the sustainability of the landscape.</i> <p><i>Competencies:</i></p> <ul style="list-style-type: none"> <i>• are able to solve scientific and practical problems of the field in consulting and design institutions and enterprises, state and local government institutions;</i> <i>• are able to develop guidelines, methodologies, recommendations for landscape management, protection, conservation and restoration.</i>
Final examination upon the completion of the study programme	<i>Qualification Work</i>

Study programme forms

Full time studies - 1 years - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	<i>1</i>
Duration in month	<i>0</i>
Language	<i>latvian</i>
Amount (CP)	<i>40</i>
Admission requirements (in English)	<i>Professional bachelor`s degree or second level professional higher education in landscape architecture</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Master Degree in Landscape Architecture</i>
Qualification to be obtained (in english)	<i>-</i>

Places of implementation

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

Full time studies - 1 years - english

Study type and form	<i>Full time studies</i>
Duration in full years	<i>1</i>
Duration in month	<i>0</i>
Language	<i>english</i>
Amount (CP)	<i>40</i>
Admission requirements (in English)	<i>Professional bachelor`s degree or second level professional higher education in landscape architecture. At least B2 level of English language skills</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Master Degree in Landscape Architecture</i>
Qualification to be obtained (in english)	<i>-</i>

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 - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	<i>2</i>
Duration in month	<i>0</i>
Language	<i>latvian</i>
Amount (CP)	<i>80</i>
Admission requirements (in English)	<i>Academic Bachelor degree in Landscape Architecture</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Master Degree in Landscape Architecture</i>
Qualification to be obtained (in english)	<i>Landscape Architect</i>

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	<i>Full time studies</i>
Duration in full years	2
Duration in month	0
Language	<i>english</i>
Amount (CP)	80
Admission requirements (in English)	<i>Academic Bachelor Degree in Landscape Architecture. At least B2 level of English language skills</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Master Degree in Landscape Architecture</i>
Qualification to be obtained (in english)	<i>Landscape Architect</i>

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

During the reporting period, significant changes were made and approved in the study programs in the field of landscape architecture and planning at Latvia University of Life Sciences and Technologies (hereinafter - LLU). By the LLU Senate decision of 8 February, 2017 No. 9-68 "On changes in the professional higher education Bachelor's study program Landscape Architecture and Planning and the academic Master's study program Landscape Architecture" as well as with the Higher Education Centre (AIC) decision No. 6/12/2017 No. 2017/11-142 approved the changes to the the academic **Master's study program "Landscape Architecture"** (education classification code 47581) in the field of study "Architecture and Construction"(Table 1) .

Table 1

Changes approved in the Master`s study program "Landscape Architecture and Planning"

General description of the study programme	Situation before changes were made	After the changes (current situation)
<i>Name of the study programme</i>	Landscape architecture	Landscape architecture and planning
<i>Language of the study programme implementation</i>	Latvian	Latvian/ English
<i>Type and level of the study program</i>	Academic education Master's study programme	Professional higher education Master's study programme
<i>Republic of Latvia education classification code IKK</i>	45581	47581
<i>Degree to be obtained</i>	Master of Architecture in Landscape Architecture (Mg.arch.)	Professional Master in Landscape Architecture (Mg.arch.)
<i>Qualification to be acquired</i>		Qualification of a Landscape Architect (Level 5)*

<p><i>Prior education requirements</i></p>	<p>- academic or professional Bachelor's degree or second level higher professional education in architecture or landscape architecture; - architect's qualification obtained before 1995; - academic or professional Bachelor's degree or second level higher professional education and persons who have acquired the following study courses: Drawing 6 CP; Basics of Composition 4 CP; History of Architecture and Garden Art 6 CP; Landscape Studies 3.5 CP; Landscape Architecture Theory 2.5 CP; Landscape Analysis 3 CP; Landscape Architecture and Design 10 CP</p>	<p>- academic or professional Bachelor's degree or second level higher professional education in landscape architecture</p>
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The study program complies with the Cabinet Regulations of 26 August 2014 No. 512 "Regulations on the State Second Level Professional Higher Education Standard" <https://likumi.lv/doc.php?id=268761> (in Latvian) (*Appendix No. 1*).

In 2009, the study programme of landscape architecture received the **international accreditation of EFLA (European Federation of Landscape Architects)**, which, at the same time, became the basis for the need for changes in both Bachelor's and Master's studies. In the accreditation sheet, the experts acknowledged the contents of the programme complies with the requirements for the education of landscape architects and the definition of the profession of a landscape architect, however, they have called for changes in the regard to the **form of the study in accordance with the Bologna Process** (*European Higher Education Area, declaration of the European Ministers of Education of 19 June 1999 in Bologna*), **so that the programmes can continue to be internationally recognized.**

In order to identify and implement the necessary changes in both Bachelor's and Master's programmes, in recent years the teaching staff of the Department of Landscape Architecture and Planning of the LLU has been involved in several councils and commissions related to landscape architect education standards in Europe and the world, for example, ECLAS (*European Council of Landscape Architecture Schools*) and EBANELAS (*Eastern Baltic Network of Landscape Architecture Schools* <http://www.ebanelas.org/>).

Therefore, the changes currently approved in both programmes are based on:

- The basic principles of the Bologna process, which recommend the form of study implementation to be 3 years for basic studies and 2 years for the Master's degree <http://www.aic.lv/portal/izglitiba-latvija/bolonas-process-latvija> (in Latvian);
- Recommendations of the International Federation of Landscape Architects (*IFLA/ Unesco charter for Landscape Architectural education; Guidance document for recognition or accreditation*) https://lnicollab.landscape-portal.org/goto.php?target=cat_1305&client_id=main;

- The Education Standard for Landscape Architects developed by ECLAS (European Council of Landscape Architecture Schools) (*ECLAS Guidance on Landscape Architecture Education*) <https://www.eclas.org/eclas-education-guide/>;
- Findings and recommendations gained within the EBANELAS project regarding the form of implementation of the existing study programs (<https://www.facebook.com/Ebanelas-205603633183585/>).

In general, **the parameters of the Professional Master`s study program Landscape Architecture and Planning have not changed** since the approval of the major changes in the programme in 2017.

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.

Until 2017, the study programme existed as an academic study programme with a small number of budget places, which did not allow to admit more than 5 students to the programme. After the changes in the study programme, an average of 15-19 students are admitted, with the possibility for the graduates who have completed the 5-year study programme and have already obtained the qualification of a landscape architect to join in the 2nd year.

Until 2017, the Master's level program existed as an academic study programme with an emphasis on research. After the changes in the programme, it is a professional study programme and is a part of two consecutive study programmes to obtain the qualification of a landscape architect. Thus, starting from 2017, the number of students in the study programme changed, with the number of students increasing (*Fig.1*). After the changes in the study programme, the number of graduates increased due to the possibility to obtain a qualification together with a Master's degree.

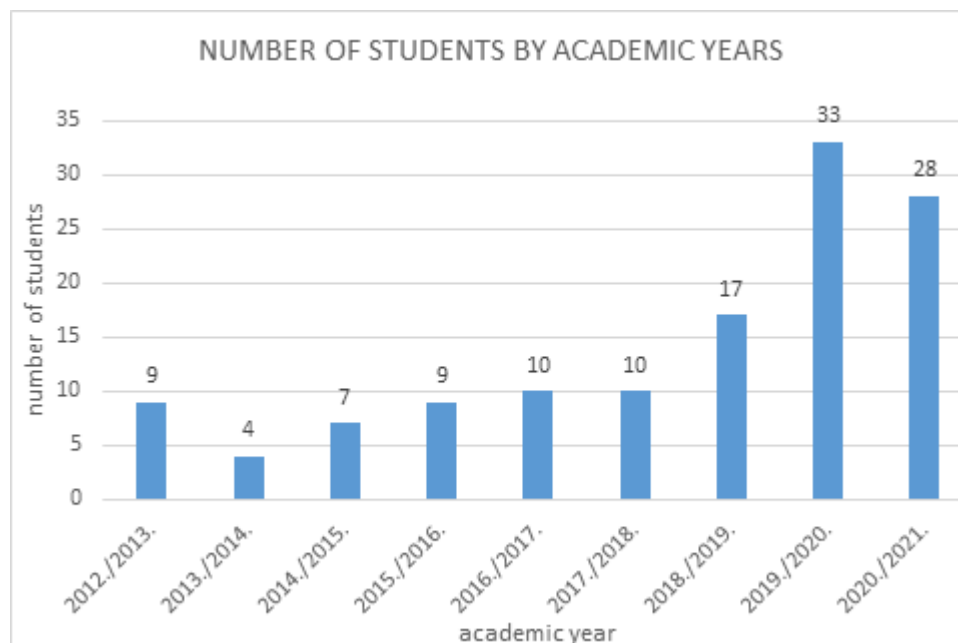


Figure 1 Number of students by each academic year

Student drop-out levels are associated with difficulties in combining studies with full-time work,

which students start relatively quickly after graduation or even during their studies. At the Master's level, students do not form study debts and they successfully obtain state-funded budget places. Every year, an average of 9 - 18 students graduate from the study programme.

The study programme is implemented in English only since 2021, thus currently the number of students in the English language group is still small. In the winter 2021 the first two English language students were admitted to the study programme. **Statistical data on students of the Professional Master's study programme "Landscape Architecture and Planning"** are available in *Appendix No.2*

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.

Landscape architecture education in Latvia can be obtained only at LLU. Studies in landscape architecture were started simultaneously with the establishment and development of this whole field of landscape architecture in Latvia in 1994, forming and still continuing close cooperation with the Latvian Association of Landscape Architects (formerly Latvian Society of Landscape Architecture, established in 1995).

The Professional Master's study program "Landscape Architecture and Planning" is the second of two consecutive study programmes that generally provides the education necessary for obtaining professional qualifications and the right of independent practice in landscape architecture.

The title of the study program "Landscape Architecture and Planning" is based on the professional standard of the profession of a landscape architect and the guidelines and descriptions of the field defined in the European Landscape Conventions (*from the European Landscape Convention: "landscape planning" means consequent future-oriented actions to improve, restore or create new landscapes*). Thus, the Programme is focusing more on landscape planning issues.

Admission requirements - academic or professional Bachelor's degree or second level higher professional education in landscape architecture - are based on linking the Bachelor's and Master's level programmes for obtaining the professional qualification required for the profession of landscape architect, as well as international standards.

The **aim** of the study programme is to provide students with the set of professional knowledge and skills necessary to start practical activities in the field of landscape architecture. As specialists who are able to independently, or in working groups, perform research, analysis, development planning, preservation, restoration and management of landscapes, public and private outdoor facilities and greenery. Acquisition of Master's level knowledge is ensured by the content of the study programme, which envisages mastering theoretical and specialized study courses, mastering the basics of research work, research methodology; acquire the necessary practical knowledge and skills in practice. To reflect the acquired theoretical and professional knowledge and practical skills in the Master's thesis.

Table 2

Analysis of study results in accordance with the aims and tasks of the qualification

(Prepared for both Bachelor's and Master's programmes, taking into account the integration and

succession of both study programmes for obtaining the professional qualification of a landscape architect)

Objectives and tasks of the qualification in accordance with the professional standard	Study results of the Master's programme	Study results of the Bachelor's programme
research, analysis, development, preservation, restoration and management of public and private outdoor facilities and greenery;		able to perform preliminary survey of the territory, summarizing the information regarding natural and anthropogenic factors, as well as regarding the nature of construction;
evaluates and studies the interaction of spatial structures in the landscape and landscape elements;		able to develop the functional zoning of the landscape territory, the compositional idea in accordance with the preliminary survey of the territory, functional requirements and work task;
assesses the impact of foreseeable changes on the landscape;	able to apply the acquired academic knowledge in solving the ecological, aesthetic and social problems of the landscape in preserving the cultural and natural heritage and ensuring the sustainability of the landscape;	
develops guidelines, methodologies, recommendations for landscape protection, preservation and restoration;	able to develop guidelines, methodologies, recommendations for landscape management, protection, conservation and restoration;	
develops projects for the restoration or reconstruction of cultural and historical and degraded landscapes and territories;	able to understand the importance of cultural and historical landscape and natural heritage in the development of the national economy;	

develops landscape and public outdoor space compositional planning and spatial structure, functional and compositional solutions for the improvement of territories and greenery, technical solutions, working drawings and specifications;		able to develop a territory improvement and greenery design for public and private outdoor space, including road and area planning, greenery plan, vertical and horizontal connection plans, improvement element plan, volumes and specifications of works and materials, as well as project documentation at all stages of the design;
advises designers, participants in the construction process and residents on the issues of landscaping, territory improvement and greenery development and preservation.	able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.	able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.
	able to solve scientific and practical problems of the field in consulting and design institutions and enterprises, state and local government institutions;	

Together, both study programmes (bachelor and master) fully meet the qualification goals and tasks set for the **profession of a landscape architect** (*professional standard*) (*Appendix No.3*), but the professional qualification of a landscape architect itself is to be granted after the completion of Master's level studies.

Professional standard "Landscape architect" is available here <http://www.aiknc.lv/standarti/AinavuArhit.doc> (in Latvian) . Translated version of the document is available in the *Appendix No.11*. It should be noted that the professional standard is planned to be updated (the existing standard is updated more than 10 years ago) by the Latvian Association of Landscape Architects as a professional organization.

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 topicality of the landscape architect's work is defined by several international and Latvian level documents and organization, as well as the LLU development strategy for 2015-2022. Topical issues of the field, labor market and science in the field of landscape architecture and planning are regularly discussed within various networks, commissions, working groups, during scientific and practical conferences and seminars, implementation of research projects, in which the LLU Department of Landscape Architecture and Planning actively participates. The teaching staff of the department also participates and closely cooperates with professional organizations in the field (*Council of Construction Industry Experts (NEP), Latvian Association of Landscape Architects, Riga Council of Monuments, etc.*). The current issues of the field and research in several groups and their connection with the study courses and activities implemented in the study programme are summarized below (*Table 3*).

Study plans to be implemented in Latvian and English are provided in the *Appendix No.4.1 and Appendix No. 4.2*.

Table 3

Assessment of the topicality and compliance of the content of study courses / modules with the needs of the labour market and scientific trends

Industry, labour market and science trends / organizations and stakeholders	How is the content of study courses included and updated in accordance with the development trends of the industry, labour market and scientific development
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<p>International educational organizations in landscape planning and management ošanā un pārvaldībā - <i>UNISCAPE European Network of Universities for the Implementation of the European Landscape Convention; ECLAS European Council of Landscape Architecture Schools; EBANELAS Eastern Baltic Network of Landscape Architecture Schools; LE-NOTRE INSTITUTE</i> - basically define educational norms and standards for obtaining the qualification of a landscape architect.</p> <p>Joint events with foreign universities, meetings, exchange of experience.</p>	<p>The teaching staff and the director of the study programme regularly attend international conferences (ECLAS) with reports, participate in the meetings of several committees and international educational projects (EBANELAS) aimed at improving the study programme, as well as in editorial boards of scientific and methodological publications or reviewing scientific works.</p> <p>Through these activities, not only the study programme is improved, but the study methods are actively improved, taking over the experience from foreign colleagues, as well as sharing and discussing our own experience.</p> <p>By communicating and sharing experience on current education issues with partner universities in Europe, Russia and other countries of the world, participating in ERASMUS exchange programs and inviting colleagues with guest lectures to our students, the latest teaching methods are identified, the form and content of studies are improved.</p>
<p>International landscape, cultural heritage, research and environmental organizations - vides organizācijas - <i>United Nations Educational, Scientific and Cultural Organization; CDCPP The Steering Committee for Culture, Heritage and Landscape; HEREIN GARDEN; NELA Network of European Landscape Architecture Archives; CIVILSCAPE; DOCOMOMO ISC / Urbanism and Landscape; PECSRL Permanent European Conference for the Study of the Rural Landscape; ICOMOS-IFLA International committee on Cultural Landscapes</i> - guidelines for the preservation, planning and management of cultural landscape, policy and competence of a landscape architect in these issues have been defined. At this level, there is a relatively large number of documents at the international level that determine the protection and development of the cultural landscape as a whole.</p>	<p>Faculty and industry (LAAAB) act as members of various networks and associations. The teaching staff has extensive research in the field of cultural and historical landscapes, which is related to the current issues of international organizations, and is integrated into study courses.</p> <p>Through these activities, knowledge, research and involvement have been strengthened directly on an international scale, integrating newly acquired knowledge and current topics in the study courses. Students have the opportunity to get acquainted with all international level documents in several study courses.</p>

<p>International landscape architecture and planning industry networks and professional organizations - <i>IFLA International Federation of Landscape Architects; IFLA EUROPE European Region of International Federation of Landscape Architects; ELCA European Landscape Contractors Association; ISOCARP International Society of City and Regional Planners; BSRLA Baltic Sea Region Landscape Architecture Group</i> - define the topical issues of industry professionals and guidelines for their solution, unites professionals in the field of landscape architecture.</p>	<p>Faculty and the director of the study programme regularly attend international conferences (IFLA) presenting their reports. Representatives of the industry are involved in various networks and associations. Thanks to the cooperation with LAAAB, there is a flow of information about current events, and the teachers themselves are members of the association and actively participate in various meetings and conferences initiated by the industry. Through these activities, closer co-operation with the industry is formed at an international level, as well as the integration of current world and European level landscape architecture issues and topics into study courses.</p>
<p>Latvian professional organizations, commissions, networks in the field of landscape architecture and planning - <i>Latvian Association of Landscape Architects (LAAA) https://www.laaab.lv/ (in Latvian); Council of Construction Experts</i> - define the current issues of the industry, as well as define the industry's demand for graduates in the field of landscape architecture through the standards and study content of the landscape architect profession.</p> <p><i>Riga Monuments Council</i> - advises on the development of Riga's public outdoor space, placing special emphasis on the preservation of cultural and historical and artistic values, and their harmonious integration into the landscape of the city of Riga.</p>	<p>The teaching staff acts as full members of the association and are also members of the certification commission. There is a regular co-operation with the association, as well as the organization of joint discussions - finding out the current issues of the field and the needs for competencies and knowledge, which are appropriately supplemented by study courses. The LLU Department of Landscape Architecture and Planning, in cooperation with industry companies and professional organizations, also organizes an Traineeship Day. In the framework of it, companies in the field introduce students to the specifics of their activities, as well as gladly invite students for traineeship. The traineeship reports have been analyzed and discussed with the students, which is also the basis for the improvement of study courses.</p> <p>In addition, a scientific-practical conference on landscape architecture is organized every year in cooperation with the association, where industry professionals share their experience with the students, faculty and colleagues, but university scientists share their scientific research and projects.</p> <p>Faculty members, working in industry councils, have the opportunity to follow current events in the industry and also to actively consult colleagues in the industry.</p>

<p>Latvian legislators and policy makers - Ministry of Environment Protection and Regional Development, Ministry of Agriculture, Ministry of Culture, Ministry of Economics - define the framework of the law for certain industry issues - territorial development, nature protection, climate change, construction industry regulation etc. The most relevant to landscape architecture are - Law on Historic Lands (draft), European Landscape Convention, Law on Intangible Cultural Heritage, Law on Architecture (draft), Law on National Parks, Law on Protection of Cultural Monuments, Law on Specially Protected Nature Areas, Law on Tourism, Territorial Development Planning Law, Construction Law, Protection Zone Law, Road Law, European Climate Law (draft) and a number of related regulations of the Cabinet of Ministers, which define the widest range of landscape protection, planning, sustainable development and management issues.</p>	<p>By cooperating, keeping up with and participating in various events of the Ministries and policy makers, both as experts and as audience or cooperation partners, the current regulatory framework and policy guidelines are transferred to the content of study courses.</p> <p>The study programme includes regulatory requirements and current issues of the field in the study courses, as well as in the development of study courses and final theses, closely reflecting current issues in Latvia - ecological planning, biological diversity, sustainable, smart and flexible landscape planning, improving the quality of living environment, social integration, preservation and integration of cultural and historical heritage, etc. (<i>more on this in Chapter 2.5</i>).</p>
<p>Latvian-wide co-operation with universities - RTU, RISEBA, LU, Bulduri Horticultural Secondary School, etc. - in implementing the professions defined by the field, perform both research and study work, and participate in Latvian-level and international projects.</p>	<p>Cooperation with other universities and educational institutions helps to define important issues of education in the field, which can be solved more effectively by organizing guest lectures, practical classes, annual <i>plein airs</i>, research and other study and scientific activities, participating in joint projects, which, in turn, is reflected in content of the study courses.</p>

<p>LLU development strategy for 2015-2022 - as defined in the vision of the LLU, “LLU is one of the leading universities of science and technology in the Baltic Sea region, specializing in the sustainable use of natural resources and improving the quality of life of the society”.</p> <p>https://www.llu.lv/en/mission-and-vision</p>	<p>The sustainable use of natural resources for raising the quality of life of the society, defined in the vision of LLU, is the main guiding principle in the implementation of the study programme, which is closely related to the profession of a landscape architect.</p> <p>In order to realize the set goals of research and education programmes, the following has been implemented:</p> <p>The strategy of LLU defines the direction of “Urban and rural landscape research and development”, which is implemented by the Department of Landscape Architecture and Planning. The aim is to identify, preserve, develop and manage the value of the Latvian cultural landscape, including the urban and rural environment, as an essential component of national identity. This aim is implemented by the teaching staff participating in research and projects, preparing publications, as well as integrating topics and project results into the content of the study course.</p>
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In addition to define the topical issues of the industry, a **study by LLU on labour demand trends** has been carried out in the framework of the project No. 8.2.3.0/18/A/009 (<https://www.llu.lv/lv/raksts/2019-08-02/petijums-darbaspeka-pieprasijums-turpinas-parkartoties-par-labu-specialistiem-ar> (in Latvian)). The LLU study on labour demand, based on the research data of the Ministry of Economics, concludes that the demand for specialists with higher education in the sector will increase by 37% and will remain unchanged until 2030. Most data sources point to an increase in labour demand. In the long term, there will be a balance or a small deficit in the supply and demand of specialists in the labour market. The labour market demand for landscape architects is closely linked to the overall development of the construction industry. The most frequently mentioned and required skills **are honesty, responsibility, accuracy, computer skills and digital competencies, as well as communication skills** - all these skills and competencies are included in the study programme from year one, learning digital technologies, as well as learning to communicate with each other - working in groups, and improving presentation skills by presenting study papers.

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 professional Master's study programme “Landscape Architecture and Planning” is the second of

two consecutive study programmes that generally provides the education necessary for obtaining professional qualifications and the right of independent professional practice in landscape architecture.

The **aim** of the study programme is to provide students with the set of professional knowledge and skills necessary to start practical activities in the field of landscape architecture. As specialists who are able to independently, or in working groups, perform research, analysis, development planning, preservation, restoration and management of landscapes, public and private outdoor facilities and greenery. Acquisition of Master's level knowledge is ensured by the content of the study programme, which envisages mastering theoretical and specialized study courses, mastering the basics of research work, research methodology; acquire the necessary practical knowledge and skills in practice. To reflect the acquired theoretical and professional knowledge and practical skills in the Master's thesis.

Planned study results - Graduates of the study program:

- are able to understand the importance of cultural and historical landscape and natural heritage in the development of the national economy;
- are able to develop guidelines, methodologies, recommendations for landscape management, protection, conservation and restoration;
- are able to solve scientific and practical problems of the field in consulting and design institutions and enterprises, state and local government institutions;
- are able to apply the acquired academic knowledge in solving the ecological, aesthetic and social problems of the landscape in preserving the cultural and natural heritage and ensuring the sustainability of the landscape;
- are able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.

Table 4

Linking the results to be achieved in the study courses with the results to be achieved in the study programme

Results of the study programme	Linking the results to be achieved in the study courses with the results to be achieved in the study programme
able to understand the importance of cultural and historical landscape and natural heritage in the development of the national economy	<p>acquired in the following study courses: <i>Theory of Landscape Architecture; Research Basics; Sustainable Landscape Development; Master Thesis; Traineeship I; Traineeship II; Territorial Development Planning; Design of Industrial Landscapes; Greenery Design Concepts.</i></p> <p>Type, methods: <i>students, through lecture materials, discussions, preparation of reports and essays, acquire theoretical and practical knowledge about the significance of cultural, historical and natural heritage.</i></p>

able to develop guidelines, methodologies, recommendations for landscape management, protection, conservation and restoration	<p>acquired in the following study courses: <i>Theory of Landscape Architecture; Research Basics; Sustainable Landscape Development; Master Thesis; Traineeship I; Traineeship II; Territorial Development Planning; Design of Industrial Landscapes; Greenery Design Concepts.</i></p> <p>Type, methods: <i>students learn different methods of developing landscape projects, concepts, guidelines and specific research, working in groups or individually, they acquire the ability to develop different types of documents and projects focused on landscape protection, management and restoration. In the study process, Master's students are involved in various LLU researches and projects.</i></p>
able to solve scientific and practical problems of the field in consulting and design institutions and enterprises, state and local government institutions	<p>acquired in the following study courses: <i>Theory of Landscape Architecture; Research Basics; Sustainable Landscape Development; Master Thesis; Traineeship I; Traineeship II; Territorial Development Planning; Design of Industrial Landscapes; Greenery Design Concepts.</i></p> <p>Type, methods: <i>by mastering the specifics of the field and issues to be solved both in a theoretical way (lectures, research) and in practice developing proposals and projects (practical and laboratory works, study projects), students acquire skills to solve problems and current issues in science and practice.</i></p>
able to apply the acquired academic knowledge in solving the ecological, aesthetic and social problems of the landscape in preserving the cultural and natural heritage and ensuring the sustainability of the landscape	<p>acquired in the following study courses: <i>Theory of Landscape Architecture; Research Basics; Sustainable Landscape Development; Master Thesis; Traineeship I; Traineeship II; Territorial Development Planning; Design of Industrial Landscapes; Greenery Design Concepts.</i></p> <p>Type, methods: <i>students acquire knowledge about the ecological, aesthetic and economic aspects of the landscape and during their studies, develop several practical works and laboratory works, as well as study projects based on the principles of sustainable landscape planning and management.</i></p>

able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule	acquired in the following study courses: <i>Theory of Landscape Architecture; Research Basics; Sustainable Landscape Development; Master Thesis; Traineeship I; Traineeship II; Territorial Development Planning; Design of Industrial Landscapes; Greenery Design Concepts.</i> Type, methods: <i>students both by working in groups in several study courses and by working independently, developing individual works in accordance with the prepared work schedule, acquire skills to work responsibly and organize all study-related processes, as well as to present works to both lecturers and municipalities.</i>
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The mapping of study courses (Appendix No.5) shows the connection of the achievable results of each study course with the results of the study programme, which can be defined as even acquisition of all study programmes by making the inclusion of most of the study programme goals in each of the study courses as comprehensive as possible - the acquisition of both theoretical and practical knowledge, skills and competencies, including them as the result of the course.

Descriptions of study courses are available in the Appendix No.6.

The **interconnection** of the information included in the study courses, the results to be achieved, the set goals and other indicators is realized through the sequential acquisition of the study courses, as well as by cooperating with several lecturers within one course and the mutual acquisition of separate study courses. For example, the study course Research Basics is related to the successive Traineeship I - students acquire theoretical knowledge of research methods in the field of landscape architecture and during practical research expeditions try different methods, prepare landscape research matrices, as well as analyze the results, learn to develop research conclusions and present them.

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 **methods** of the study programme implementation are based on the gradual and project-oriented acquisition of knowledge, skills and competencies, which are realized through the following principles:

- Study courses are designed to be as **voluminous** as possible (CP), subordinating each of them to one topic, which is comprehensively considered, integrating the related sub-topics, using different methods and inviting several lecturers. It reduces the fragmentation of study courses and topics, helps students to master the subject in a more concentrated way and with a smaller number of examinations per semester.
- **Organization of study courses** - there are always lecture materials presented by the lecturer, small tasks that successively help to master the topics or successively develop the

final work / project of the study course in stages. It helps students to learn the subject gradually and continuously by testing their knowledge with the support and consultation of the teachers;

- To learn the study courses, lecturers and students use LLU **Moodle e-studies** (*especially relevant during the Covid-19 pandemic*), which helps to publish materials and video lectures for students, to conduct online lectures and seminars, students are able to submit their work, and lecturers - to publish the evaluation. Also, in this environment it is possible to provide feedback, comments on the submitted works, to communicate, as well as create a transparent and easy-to-understand e-environment for each study course, where the student can find all the necessary information about the course.
- To facilitate **communication**, an e-mail has been created for each student and lecturer at LLU, but communication with all parties involved in the study course is possible through the e-learning environment.
- The **study environment** is organized creatively - each course of the students have their own workroom in the study building at the Valdeka Manor, where they can stay and work also outside of classes, because the study programme is largely based on independent work. There is also access to computer classroom with all the necessary computer programs, large-format scanning, printing and laser cutting.
- **After each examination period, students provide their assessment** of the content of the study course and the lecturer's work, which helps to improve the content of the study course and teaching methods.

The **principles of student-centered education** in the study programme are implemented as follows:

- Respecting the needs of students, the study environment accessible to each student is ensured, the accessibility of the environment in the premises is also ensured. Students have the opportunity to attend classes and use study and scientific equipment, to use the study infrastructure also outside of classes.
- Lecturers are available for students for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail.
- Students' independent work is planned and structured (*there are reports and attestations*). Students are provided with both mandatory and additional consultations, providing the support of the lecturer.
- In order to structure the students' learning process and facilitate students' sequential and regular acquisition of the subject, study course schedules have been prepared in each study course with the topic of each week, the work to be performed and evaluated, and the conditions for the completion. At the beginning of the study course, students are introduced to the schedule and topics of classes, as well as the conditions of the completion of the study course.
- Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of reconciliation of study courses when returning from mobility (LLU Rector's Regulation No. 4.3. - 8/78 (02.22.2016.) "*On Procedure of Academic Recognition at LLU*" is available in the Appendix 7)
- The review of student complaints is regulated by the LLU Study Regulations (https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf), but complaints are also reviewed by the commission. In addition, students are invited to seek assistance by escalating the issue, starting from the director of the study programme, the head of the

department, vice-dean, dean and, finally, the vice-rector for studies.

- Ensuring mutual respect and participation of students and lecturers, the Code of Ethics of the LLU has been developed (https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf).
- In order to ensure the participation of students in the improvement of the study process, the director of the study programme regularly listens to the students' suggestions and explains possible solutions for improving the studies. After the changes in the study program in 2017, all students' courses had the opportunity to integrate into the modified programme, the changes were explained to the students in detail and additional information was given, each student's consent to join the modified study plan was received (*signature sheets*).
- Students studying landscape architecture participate in the improvement of the study process in cooperation with the Student Self-Government, which delegates its representatives to the Council and the Scholarship Council of the Faculty of Environment and Civil Engineering, LLU Council and Senate.
- Students participate in surveys, discussions and evaluate the study process. Discussions and meetings of lecturers and student representatives have become a tradition to discuss study programmes, the implementation methods of individual study courses and new proposals in the study process.
- Student evaluation criteria are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria when starting the specific study course.
- The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works.
- In larger study courses, assessment is performed by several lecturers, which eliminates subjectivity in assessment. The final works are evaluated by a commission of 7 people.

LLU has developed Study Regulations which envisage the **evaluation** of students' works, using qualitative and quantitative evaluation methods:

- **For the qualitative assessment**, 10-point scale criteria are used (*1 to 10 points, successful assessment starting from 4 points*) or the pass/fail assessment. All final theses, projects and individual practical works are evaluated with a mark. Laboratory work, which is mainly performed in person, is often assessed by pass/fail (https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf),. If part of the work in the study course is intended to be performed as group work, there is always also an individual work which is assessed with a mark and which has a greater decisive role in the final assessment.
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS). Every semester the student acquires study courses in the amount of 20 CPs (30 ECTS). In total, the study program is mastered if the study courses in the amount of 80 CPs (120 ECTS) have been successfully completed.
- In addition, **attendance** of the study course is controlled throughout the course. The study programme has certain requirements - attendance of classes in the amount of not less than 75%. Tests and/or course project must be submitted within the specified time limit.

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.

Students have an traineeship in the **amount of 20 CP** in the 2nd semester, but, in general, it is based on the knowledge, skills and competencies acquired at the Bachelor's level and the first semester of the Master's programme. The aim of the traineeship is to learn the following: To strengthen theoretical knowledge with practical skills in the development of specific projects, project implementation, to acquire organizational, economic and psychological skills of work management. To collect the necessary materials for the development of the final thesis. Traineeships are elaborated according to the Traineeship Regulations of LLU (*Appendix No. 9*). The program of the Traineeships is available in the *Appendix No.8*.

At the end of the traineeship, students prepare a report, as well as the traineeship supervisor prepares an traineeship reference, in which the information provided helps to supplement the study content, understanding the current issues and the latest technologies.

The tasks of the traineeship fully cover the tasks of the study programme, Traineeship I - with an emphasis on the acquisition of theoretical knowledge, the practical part of the research knowledge in the field - landscape research and analysis; Traineeship in the 2nd study year is putting the main emphasis on the main competencies of a landscape architect - outdoor research, planning, author's supervision during installation. Relation between the results of Traineeships and results to be achieved in the study programme is shown in the *Appendix No.12*.

In order to support students in acquiring traineeships and achieving results, **Traineeship Days** are organized every year, where entrepreneurs who are ready to offer traineeships meet with students and explain the specifics and opportunities of their company. Entrepreneurs are also ready to take on English-speaking students.

In addition, students have the opportunity to use **ERASMUS traineeship** opportunities, which are used by 2-3 students from the study program every year. The traineeship supervisor maintains contacts with both students and entrepreneurs during the traineeship in order to make adjustments or changes during the traineeship, if necessary.

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.

Topicalities of the field in connection with the content of study courses are described in more detail in *Chapter 2.1*. Below is the analysis of the topics of the final works in relation to the topicalities of the field and research, including the research directions defined in the research section of the LLU development strategy (*Fig.2.1*).

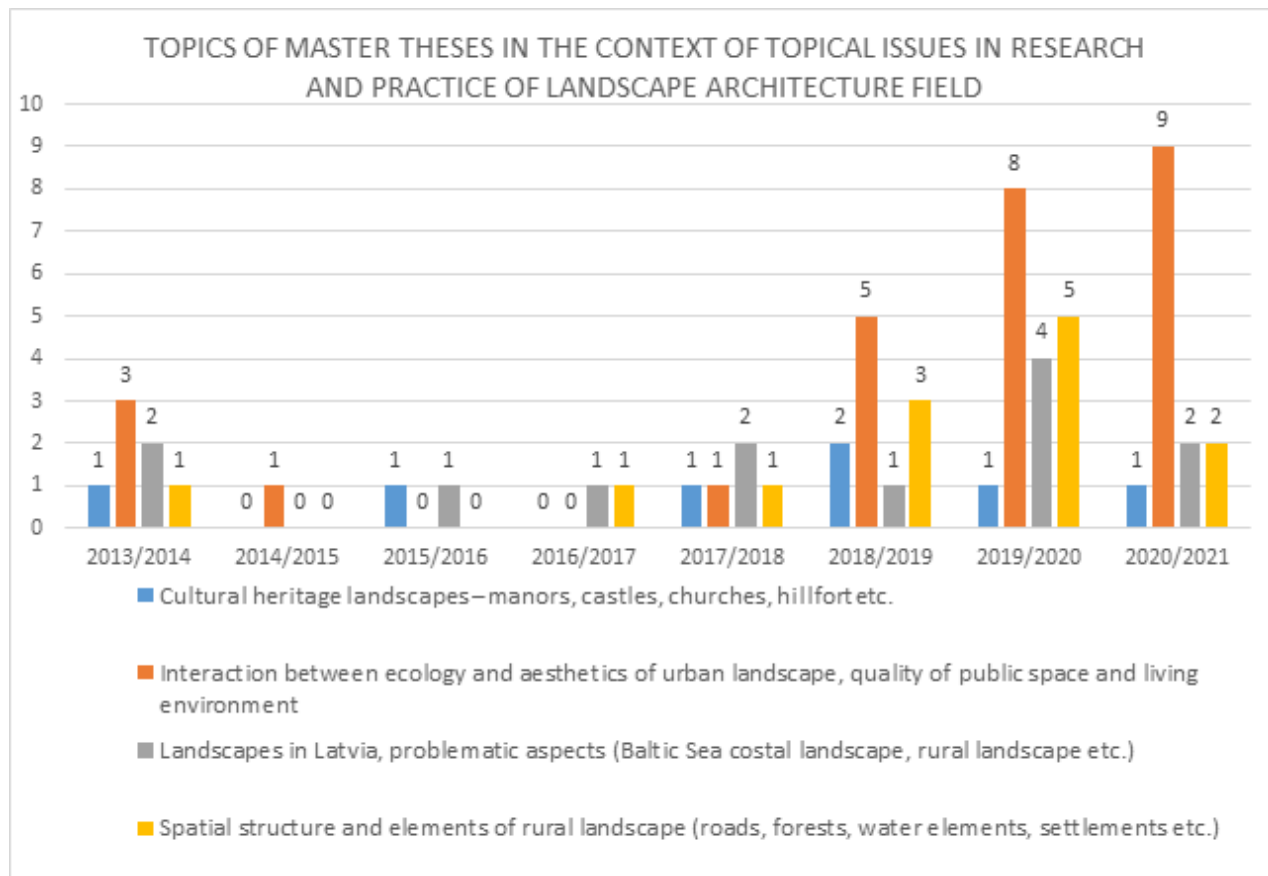
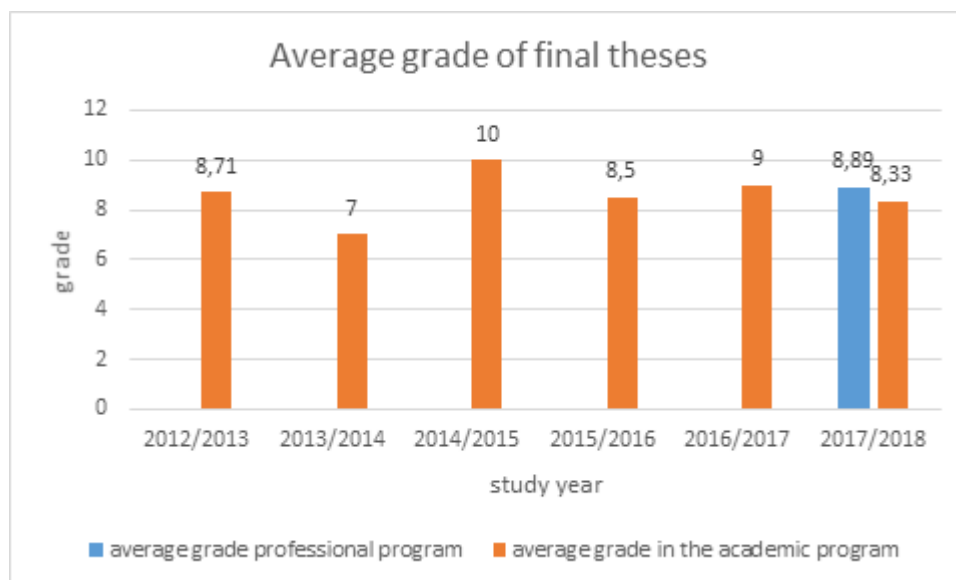


Figure 2.1 The main groups of topics for final theses

In line with the profession of landscape architect, the topics of Master's theses solve the problems of ecological planning and aesthetics of urban environment, but more and more students are also interested in rural landscape issues related to preserving rural landscape identity and development of certain rural landscape elements - road landscape, rural settlements.

The student is given 15-20 minutes to defend the master's thesis, followed by the reviewers' reports and the supervisor's feedback, as well as the commission's questions and clarifications. The student's presentation, the graphic design of the developed master's thesis and the explanatory text of the theoretical part, as well as the answers to the questions clearly show the theoretical and practical preparation of each author. Each member of the commission evaluates with an appropriate number of points from 1-10 according to the following criteria and course, functional spatial solution, quality of graphic design and presentation skills. After the public defense of the master's thesis in the closed session of the commission, the evaluations of the final theses are discussed and their compliance with the qualification and scientific degree of landscape architect. In the end, the chairman of the commission publicly announces the results of the defense of the master's thesis to the students and those present.



In general, the evaluation of the final theses is high (*Fig.2.2.*), and the master's theses are highly valued by the commission, noting the topicality of the topics and the students' ability to delve into the problems, as well as to develop proposals for landscape development.

Master's theses participate in competitions and are praised. For example, in 2020 the master's student won the first place with a master's thesis on the topic "Landscape of former railway line Rīga Preču – Ēģi" in the student research competition within the Latvian Tourism Forum organized by the Latvia Investment and Development Agency (LIAA).

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.

Student surveys

Student surveys have been conducted for several purposes, taking place regularly, interviewing both individual applicants and students of later years. Most often, surveys are organized centrally or on the initiative of the faculty, student self-government, as well as for the evaluation of each study course through the LLU IS system.

Question group	Analysis (changes, trends)
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<p>How did students choose the study program, what motivated them, did they know their choice of the study programme before leaving secondary school?</p>	<p>Comparing the conducted surveys, it can be concluded that students know more and more which study programme they will choose in advance - this is related to the wider availability of information, which allows students to get acquainted with the content of the study programme and their future profession. In turn, the choice of LLU is still based on the priority to acquire quality education and suitable study programmes, the availability of budget places as the grounds for selecting a particular programme has decreased. It describes students as purposeful in choosing a particular profession. It should be noted that the profession of a landscape architect can be obtained only at LLU since the establishment of the study programme more than 27 years ago. These results help to more effectively prepare information about the study programme for prospective students, organize open-door events and other informative events.</p>
<p>From which regions do LLU students come to study?</p>	<p>The regional representation of students has not changed - there are still quite a lot of students from Zemgale and Vidzeme, but all regions are represented. These results help to understand the needs of students and the general tendencies of national competition in education, as well as to organize work on the landscape architecture projects and landscape plans.</p>
<p>Where was the information about the study programme obtained and was the information sufficient?</p>	<p>If the prospective students in the 2014 survey drew information from the LLU website, from friends, from the open door events, then in recent years (in the 2019 survey) the importance of social networks has increased. This was also facilitated by the Facebook and Instagram accounts created for the Department of Landscape Architecture and Planning (https://www.facebook.com/aaplif/ - 730 followers https://www.instagram.com/ainavu_arhitekti_llu/ - 174 followers). The information on the LLU website has also been expanded and developed in a clearer way, including videos with stories of students and graduates, as well as descriptions of study programmes https://www.llu.lv/lv/pamatstudijas/ainavu-arhitektura-un-planosana (in Latvian) and https://www.llu.lv/en/landscape_architecture (in English). Additional information in Latvian is also available on the website of the Faculty of Environment and Civil Engineering.</p>

Students' motivation to study in a specific programme at LLU	Career opportunities (<i>students choose study programmes with the opportunity to obtain a professional qualification</i>), as well as the average salary and prestige of the profession in the industry always remain the main motivators. More and more students choose an attractive profession and study programme. In order to popularize and strengthen the profession of a landscape architect, promote its recognition, LLU closely cooperates with Latvian municipalities and the Latvian Association of Landscape Architects https://www.laaab.lv/ (in Latvian) in implementing various projects and activities, including the involvement of the public and other stakeholders.
What risks can affect successful studies?	Students in the previous surveys noted their insufficient knowledge in certain topics as a risk, as well as their inability to meet study requirements or combine studies with work. In recent years, the number of working students and the number of older students (<i>who are acquiring their second degree</i>) have increased, making it increasingly difficult for students to combine studies with work, especially in senior courses, when most students already work in the industry. Taking into account the risks, in some cases additional classes are organized for in-depth study of a topic, including inviting guest lecturers.
How do students feel at LLU (including during the restrictions caused by the Covid19 pandemic, in distance learning)?	When starting their studies, students have to get used to the requirements of independent work and higher education, which differ from the school environment. Consequently, many students note a slight fear and stress, whether they will be able to cope with the study process. However, students like the study environment and atmosphere, as well as the infrastructure and the availability and support of lecturers. A survey conducted during the Covid19 pandemic (04.2020) reveals that they spend more time acquiring knowledge than before, students have difficulty motivating themselves to study, and stress is caused by uncertainty about the end of the study year. However, a regular and uninterrupted study process is ensured through the LLU Moodle e-learning environment (<i>which students appreciate as a good opportunity</i>) and students are convinced that they will be able to complete all study courses on time and successfully. It should be noted that the acquisition of the practical part of the study programme remotely is difficult and cannot provide excellent results, as well as requires a much greater effort on the part of lecturers and students. Therefore, remote work should not be included as an independent approach after the situation has improved.

Student surveys for each study course (centrally through LLU IS system)	<p>Students have the opportunity to evaluate each study course, where they evaluate the availability of the teaching staff, the ability to clearly present the information of the study course, the feedback provided, the methods used, as well as the clarity of the evaluation criteria. In general, the average rating of the Department of Landscape Architecture and Planning remains consistently high (in the range of 3.5-4.0). It should be noted that this survey is not completed by a large number of students, so it should be improved to obtain a more representative result.</p> <p>As the construction industry changes and develops, more and more challenges and necessary knowledge appear, which are integrated into the existing study courses, supplementing the study programme (<i>computer programmes, BIM, BIS, materials and technologies, landscape ecology and environmental protection, smart and flexible planning, public involvement in the planning process, photoremediation, etc.</i>).</p> <p>This information helps to improve each study course and is visible to each lecturer in their assessment of study courses.</p>
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Graduate and employer feedback

In the field of landscape architecture, employers are most often also graduates of LLU landscape architecture and planning study programmes. Thus, the overall assessment by both groups of respondents is analyzed. Information about those working in the field and their opinions is obtained by the LLU both from surveys and much broader and more specific discussions organized by the industry, where one of the topics is the quality of education (discussions are organized both during LAAA annual general meetings, in separate thematic groups and councils (*representative of the study programme*) and in updating the professional standards).

Question group / topic	Analysis (changes, trends)
Graduates have acquired the theoretical and practical knowledge necessary for work in the field and are able to apply it in the performance of work tasks	<p>Respondents note extensive theoretical studies and some topics that would require more practical knowledge. It should be noted that the Latvian labour market in the area of landscape architecture is changing and more and more projects involve several specialists (as it is globally), which allows a landscape architect to act within their competences, rather than to deal with all aspects of the industry as a whole (<i>landscaping elements of design, lighting, horticulture, installation, building structures, etc.</i>).</p> <p>The results have been used to improve the balance of the overall theoretical and practical parts of the study programme.</p>

Graduates are able to explain and discuss aspects of the relevant field of science	In general, graduates are able to explain aspects of the work, but many still need to learn to do so in a reasoned, convincing manner. For this purpose, time is allocated in the study process for the presentation of works and speech training in both Latvian and English. This information helps to improve graduates' ability to discuss industry topics by integrating discussions and presentations into each course, including project presentations to stakeholders.
In their work, the graduates are able to use and, if necessary, learn and use modern technologies and innovative solutions.	The majority of respondents are positive about this indicator, pointing out that in recent years, graduates' knowledge of technology has even surpassed that of the employer, thanks to a modern and powerful computer classroom and knowledgeable teachers. Acquisition of modern technologies in the study process is a priority, it is integrated into the study courses, acquiring the software used in the field starting from the 1st year.
The graduate is able to plan their time and resources for the performance of the assigned duties	Most respondents are positive about this indicator. During the studies, work on project development is related to self-discipline and the ability to organize one's work, which, when concluding studies, is also useful in practical work. Time management is one of the biggest challenges for students - in each study course, teachers prepare a time schedule that helps students to sequentially learn the subject and complete the assigned tasks while learning to plan their work.
Ability to work in a team, performing the assigned work duties responsibly and in good quality	All respondents positively noted this indicator, facilitated by the number of study tasks that students must complete in groups. Team work in the study programme is improved in several study courses, allowing students to work in groups and jointly plan their time, as well as seek compromises and common views to solve problems.
Ability to competently express an opinion on professional issues, justifying it	Graduates are generally able to express their professional opinion on industry topics, but not everyone succeeds to do it convincingly, which is associated with the experience of the young professionals.
Motivation for self-growth and further education	Most respondents are positive about this indicator.

Ability to make decisions and find creative solutions in changing or uncertain circumstances	Decision-making is an important aspect of work, where some graduates cope well, but not all graduates are able to make decisions in uncertain situations, this could be explained by the instability of the industry itself in the labour market.
Ability to motivate their colleagues / subordinates for self-growth and professional development	Respondents note the poor motivation of other colleagues, which can be explained by the independence of the profession.
Demonstrates self-initiative in the performance of the assigned duties in order to achieve the best possible result	Most respondents are positive about this indicator, noting graduates' desire for better results.
Be communicative, responsive	Most respondents are positive about this indicator. However, it should be noted that such an assessment depends on the characteristics of the personality, as well as on the specifics of the work and the team.
Understands professional ethics, is able to evaluate the impact of their professional activities on the environment and society	Most respondents are positive about this indicator.
What other knowledge and skills do you expect from LLU graduates?	Both the graduates themselves and the employers had noted the lack of knowledge of plants. Therefore, by making improvements to the study programme, the amount of CP in study courses has been increased, where it is planned to learn more about a range of plants. In the future, support is needed for the creation of model gardens near the building of Valdeka Manor, so that students can also acquire practical skills in gardening. It should be noted that all over the world, within the competence of a landscape architect, knowledge on plants is acquired on a more conceptual level (<i>knowing plant types, shapes and diversity, rather than planting and care technologies</i>), because teamwork and cooperation with gardeners is important. In Latvia, due to the poorly developed horticultural industries, the labor market is distorted, and the competences of a gardener are demanded from a landscape architect. In co-operation with the industry and the Bulduri Horticultural Secondary School under the supervision of the LLU, work is currently underway to strengthen the horticultural 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.

The students of the study programme are active in ERASMUS mobility programmes (*Fig.3*), the exception is 2017, when the changes in the study programme took place and the students avoided going on exchange due to adaptation to the new study plans. Currently, when the study process has been smoothed out, students are happy to go on ERASMUS exchange at the Master's level, specifically for traineeship, because the traineeship in the programme is planned specifically at the Master's level, after the changes to the programme implemented in 2017.

Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of reconciliation of study courses when returning from mobility (LLU Rector's Regulation No. 4.3. – 8/78 (02.22.2016.) "On Procedure of Academic Recognition at LLU" is available in the Appendix No.7).

The most popular higher education institutions chosen by students for exchange are - *Wroclaw University of Environmental and Life Sciences, Corvinus University of Budapest, Neubrandenburg University of Applied Science, University of Algarve, Swedish University of Agricultural Sciences, Estonian University of Life Science, TEI of Kavala, Szent Istvan University, University of Porto*. The students' choice is based on the offer of the universities, which is equivalent to our study programme and easily comparable. In general, 70-90% of study courses acquired abroad are equated to those in the current programme. The exception is the specific study courses offered by our study programme - architecture, Latvian plants, Latvian legislation, labor and civil protection. In recent years, due to the global instability and the pandemic, students are less likely to go on exchange.

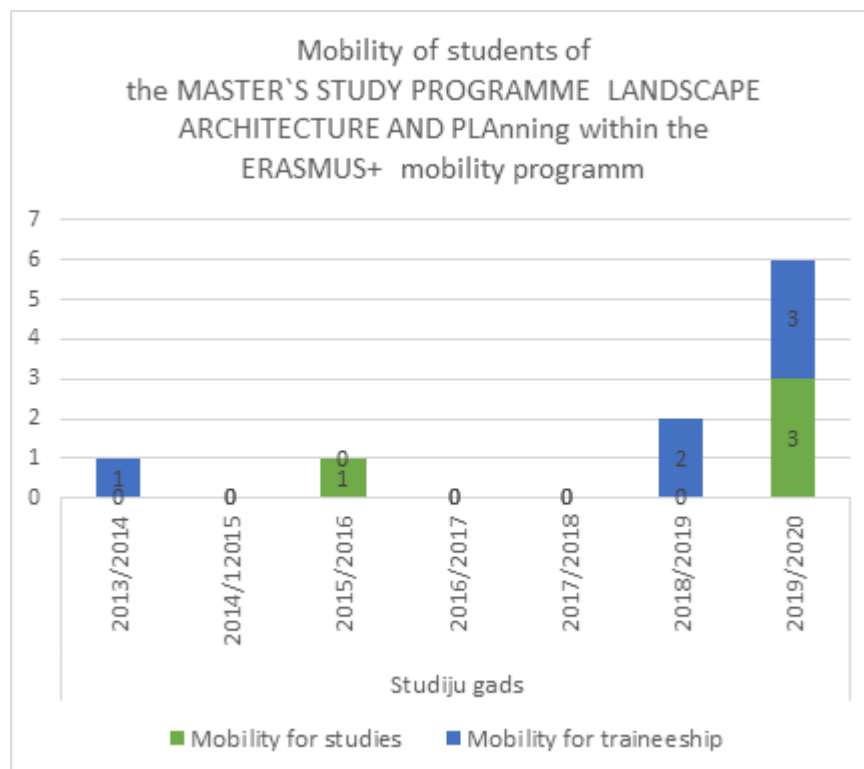


Figure 3 Number of students of the programme participated in ERASMUS+ mobility programme during the reporting period

The total number of incoming students within the Erasmus exchange program is 27 students from different countries - Portugal, Greece, Germany, Turkey, Poland, Spain, Slovakia, Iceland, Russia, Ukraine, Romania, etc. (Fig.4).

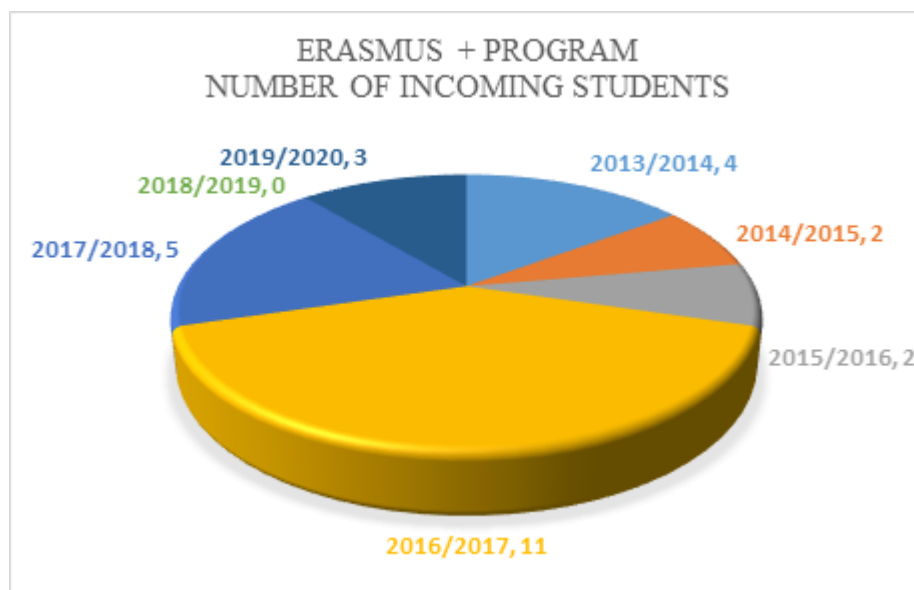


Figure 4 Number of incoming international students within the ERASMUS+ mobility program

In addition to the ERASMUS exchange, the study program participates in the **Bova - Nova network**, organizing study courses in cooperation with Lithuanian and Estonian universities. <https://www.bova-university.org/> <https://www.bova-university.org/nova-university-network>

- In 2014, BOVA study course "Landscape Studio", where 5 students of LLU and 5 foreign students from Estonia and Finland participated.
- In 2015, within the framework of BOVA intensive Master's course "Landscape Ideology", an international group of students - 21 students from the Estonian University of Life Sciences.
- In 2016 - BOVA course "Landscape Cognition", a total of 15 students from Estonia, Lithuania and Latvia.
- In 2017 - BOVA international undergraduate study program "Landscape in Focus", 32 students from four countries - Latvia, Lithuania, Denmark and the Czech Republic.
- 2018 - Developed international BOVA basic study course "Landscape Regeneration of Degraded Areas" in cooperation with Ludza municipality. 8 Lithuanian and 15 Latvian students participated in the course.

Students also have the opportunity to participate in **international summer schools** organized by the department. Funding was provided by the State Education Development Agency. The summer school is implemented in cooperation with the Lifelong Learning Center of the LLU:

- in 2013, the second international summer school of landscape architects "Local Landscape Via Ecology, Art and Mystic" was organized and successfully held, which was attended by 10 foreign students from different countries - China, Mexico, Spain, Estonia, Lithuania, Germany, Austria, Poland, Hungary, Czech Republic.
- In 2014, the summer school "Re-feeling the city landscape. Riga" was organized and participants included 7 students from Austria, China, Bulgaria, Germany and 2 students from Latvia <https://www.facebook.com/summerschoollatvia/videos/955857677763406>
- In 2015, the International Summer School "Daugava River. Visible. Invisible" was attended by 6 students from 4 countries and 2 LLU students.
- In 2016 - Within the framework of the International Summer School "W-Scape" (In cooperation with the University of Finland, Jelgava and Riga municipalities (within the

Interreg project)) 9 students from Estonia, Finland, Slovakia, Azerbaijan, Uzbekistan, Sweden and 15 LLU students took part.

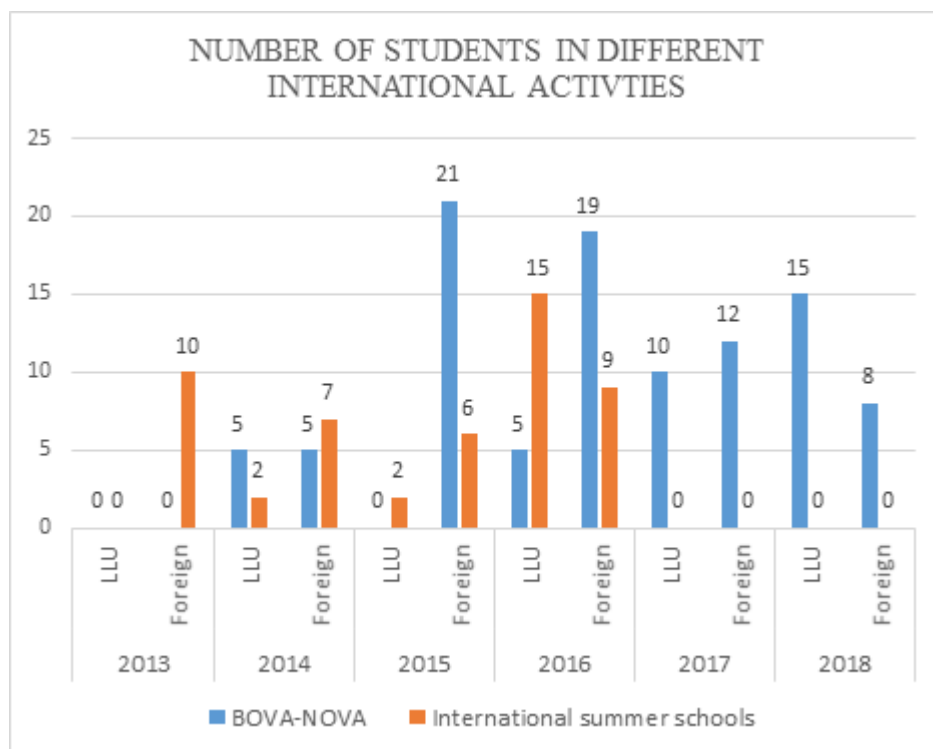


Figure 5 Number of LLU students and incoming international students participated in different international activities

A total of 151 students participated in international activities (excluding ERASMUS) in the reporting period, of which 97 were foreign students (Fig.5).

In addition to opportunities for various exchange programs, **cooperation has been established with St. Petersburg State Forest Technical University** (Russia) and exchanges take place every year. In the intensive study course, students learn the principles of planning cultural and historical gardens, visit historical gardens and parks in each country under the guidance of lecturers, excursions and planning *plein airs* are organized. Around 30 students visited each country in two years.

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 resources of the study program consist of three groups - equipment, software and literature. Literature on the following topics is available in libraries, information center and methodical cabinet - Landscape and nature; Ecology and environmental protection; History of architecture and garden art, cultural history; Landscape planning; Greenery; Outdoor building materials and elements; Construction and maintenance of facilities; Landscape management, economics, management; Environmental psychology, landscape sociology; Public involvement, marketing, communication; industry scientific journals. Students also have access to the LLU library remotely, as well as access to scientific databases using their student access passwords <https://llufb.llu.lv/en>. Students also have access to the scientific journal "Landscape Architecture and Art" of the Department of Landscape Architecture and Planning, both in printed and digital form https://llufb.llu.lv/Raksti/Landscape_Architecture_Art/, which also reflects the research of Latvian scientists in the field of landscape architecture and planning.

The relevance of the study program resources with the achievable results is reflected in Appendix No.10.

Example of using equipment in the study course "*Greenery Design Concepts*":

- Acquire theoretical material in lectures and independently - by using computers, screens, databases and book repositories;
- Carry out historical research of the territory, analysis of the current situation - by using photo and video cameras, learn various research methods from books and magazines and search information on the historical development of the place;
- conduct research of the territory in nature - visual materials have been printed (plotter, computer, software);
- develop the drawings of the solutions - digital sketching tools, computer, graphic computer software, plotter, scanner;
- develop the final project - digital sketching tools, computer, graphic computer software, plotter, scanner;
- defend the project - computers, graphic software, screens.

Provision of financing. The number of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for **Master's programmes is 1.5** and the social funding of one study place for Master's programmes is 164.34 EUR, the study cost **coefficient for the professional Master's programme "Landscape Architecture and Planning" is 3.1** (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"), costs per student in the professional Master's programme "Landscape Architecture and Planning" amount to 7744.32 EUR. In 2021, the **tuition fee** in the study program is 1400 EUR per semester, or 2800 EUR per year for Latvian students and 4000 EUR per year for foreign students.

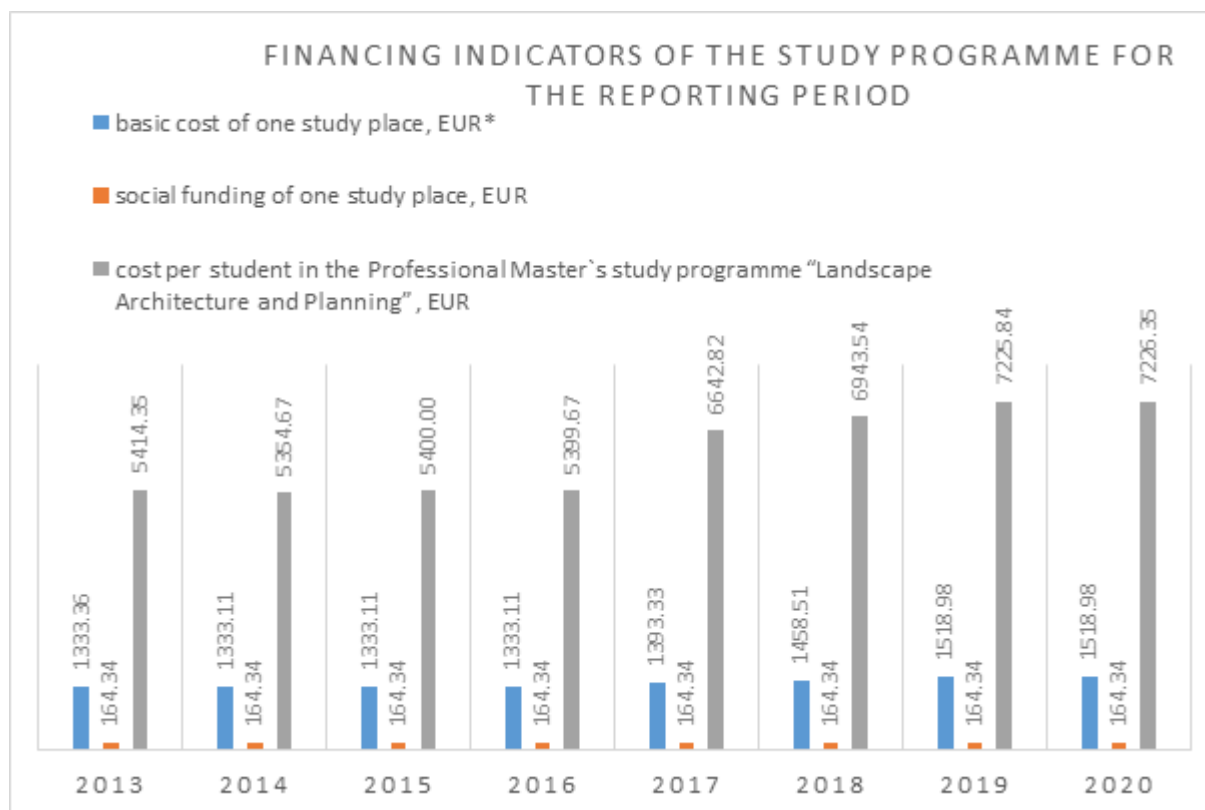


Figure 6 State funding per study place in the bachelor study programme "Landscape Architecture and Planning"

* Cost per student slightly differ at the same basic data (the basic cost of one study place and the social funding of one study place) in 2014, 2015 and 2016, and 2019 and 2020, because every year the provision of the study coefficient is provided in % with some decimals and may be slightly different. Rounding up, this provision is 100%, but, in figures in the contract in 2020 it was - 99.98242%, in 2019 - 99.97517%. Similar situation was in 2016, 2015 and 2014, when the provision was 85%, but in figures in the contract in 2016 - 84.45564%, in 2015 - 84.46058%, in 2014 - 83.7295803%

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific

base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the Master's study program "Landscape Architecture and Planning" consisted of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Financial support has increased during the reporting period, but so have expenditures, the minimum wage rate and other economic indicators. Paid students do not cover the state-paid budget places, because tuition fees for similar study programmes in the field of education in Latvia are not yet close to the state funding, so it would not be competitive to determine it this way, but the paid places of the study programme includes only students with study debts, except for the first year, when there are more students enrolled than there are budget places available.

Additional financial support opportunities for students in the programme

State scholarships in the professional Master's study programme until 1 January, 2020 were 99.60 EUR, but for the period from 01.01.2020 until 31.12.2021, the scholarships are intended to reach 200 EUR per month. In one study year, scholarships are awarded to an average of 5 students, according to the number of successful students, the scholarships are distributed in proportion to the students of each study year who have received the highest grades. Students in the programme also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU (Senate, Jāņa Čakstes, Kārļa Ulmaņa etc.), as well as special scholarships for the field (the scholarship of RTU Development Fund and SIA Itera Latvija awarded since 1998), the scholarship of A.Tramdahs of the Faculty of Environment and Civil Engineering. Such scholarships have been received by 15 students of the programme during the reporting period (*Fig.7*) .

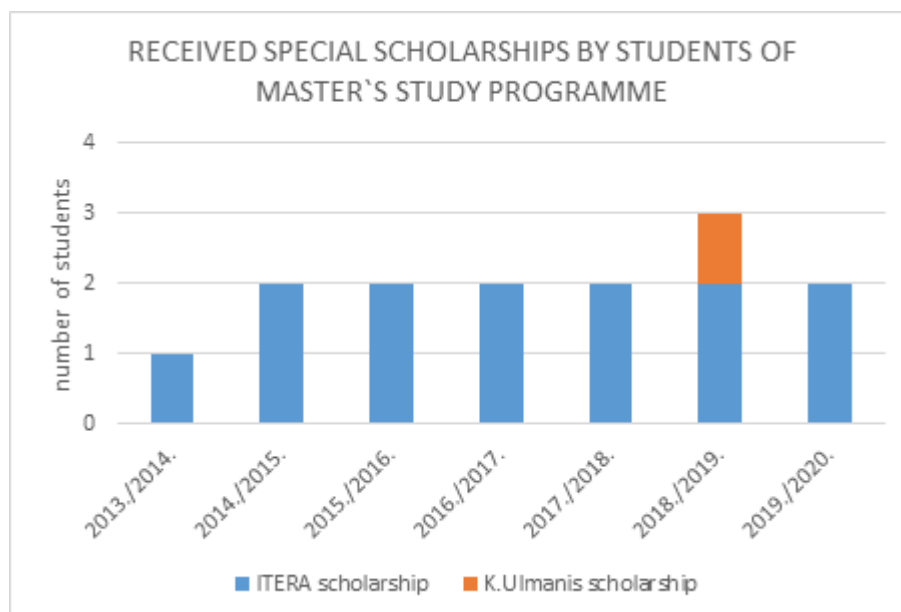


Figure 7 Number of students of the programme awarded by other scholarships during the reporting period

In general, it can be concluded that the study base, scientific base, information base, material and technical base and financial base comply with the specifics of the study programme, its implementation conditions, as well as student-cantered education principles and creates preconditions for achieving study results and indicates the possibility to ensure a high quality study process.

The department also ensures the provision of the study process **in cooperation with other structural units of LLU**:

- In cooperation with **the LLU Language Center** and other structural units of the LLU, a conference "Students on their way to science" was organized;
- Cooperation with the **Fundamental Library of the LLU** in work with library resources, including databases;
- Cooperation with the **Bibliographic Information Department of the LLU** in supporting students' work with databases and study literature and databases available at the LLU;
- Cooperation with LLU **Communications and Marketing Center** and **Study Center**, to create understanding about the use of e-studies and LLU IS in the study process, finding current information on LLU and faculty websites, social media;
- Cooperation with the **LLU Museum**, to form an understanding of the cultural and historical values managed by the LLU, the historical development of the LLU;
- Cooperation with the **Operation and Maintenance Administrative Department of the LLU** for the implementation of a safe study process for mastering labor safety and civil protection issues.

In ensuring the study process, there is also cooperation with **other universities** in several directions:

Organization of conferences, review of scientific publication of the conferences:

- Cooperation with **Riga Technical University (RTU), Faculty of Architecture and Urban Planning** teaching staff in reviewing scientific articles for the publications of the scientific journal "Landscape Architecture and Art";
- Cooperation with **RISEBA, Faculty of Architecture and Design**, review of scientific articles for the scientific journal ADAMarts (Architecture, Design and Audiovisual Media Arts,

Research work

- Cooperation with **LLU Forest and Water Resources Scientific Laboratory, Forest Faculty** and **Faculty of Agriculture** in project implementation, development of scientific publications, research.

Thesis evaluation commissions

- cooperation with **RISEBA and RTU in the evaluation of final theses in the field of architecture.**

Participation in doctoral and professor councils

- cooperation with **RTU Faculty of Architecture and Urban Planning**. Representatives of both universities are members of the joint RTU and LLU Architecture Professors' Council, RTU Architecture Promotion Council and LLU Landscape Architecture Promotion Council.

Conducting lectures and seminars

- cooperation with **the University of Liepaja**, in the spring semester of 2018, reading and conducting the study course “Environmental Design / Landscape Architecture” in the professional Master's study programme “Ecotechnology”.

Organizing student plein airs and other activities

- Organization of the annual Latvian School of Architecture plein air in cooperation with **RTU, Riga Building College (RCK)** and **RISEBA**, LLU.

In addition, there is cooperation with the graduates - conducting guest lectures, organizing excursions, and participating in “Open Door” events and marketing events, talking about current events in the field, study experience and their work responsibilities, the specifics of the profession.

In general, in order to ensure the study process, there is a continuous cooperation both with the structural units of the LLU and with other universities. Together, they help to strengthen the internal links of LLU, providing students with access to resources, support on various issues, and organizing various events. Cooperation with other universities helps students to get to know the future colleagues of the industry, to establish friendly connections and to become aware of the breadth of the industry, as well as the stakeholders, the practical and scientific issues.

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 changes in the composition of the teaching staff are mainly based on the increase in the number of lecturers, who are the teaching staff of the department and have obtained doctoral degrees during this period (Fig.8). At the moment, the department has three professors, one professor *Emeritus* and one associate professor, who ensure the transfer of research methods and results of the field to the study process.

During the accreditation period, several academic staff members with a doctoral degree were involved in the implementation of the study programme, thus promoting a closer connection between the study process and scientific achievements, the succession in the research and its reflection in the final theses of students and creating interest of students in further education in the doctoral programme.

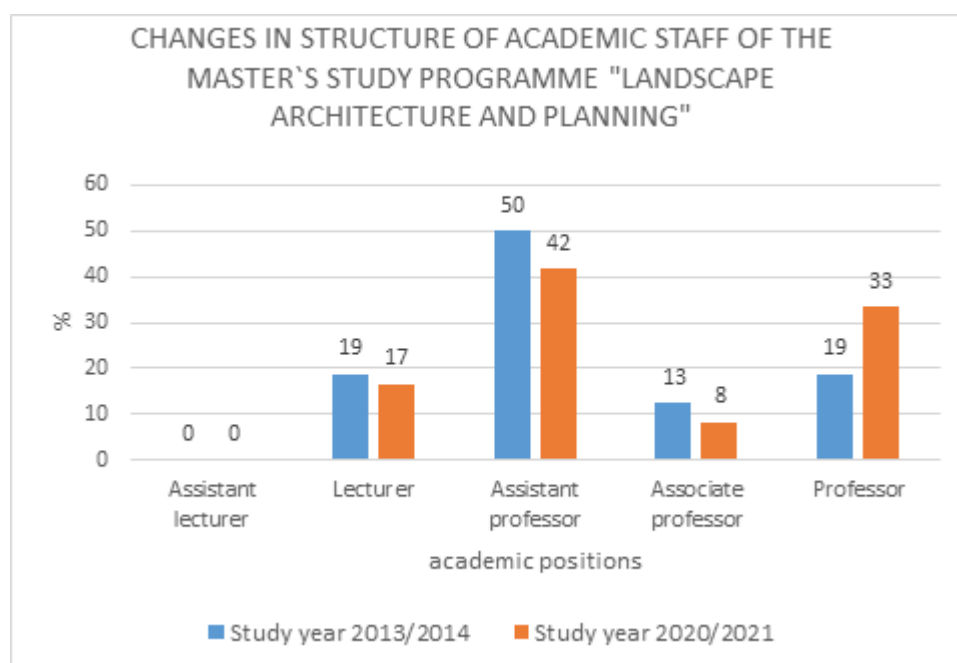


Figure 8 Changes in structure of academic staff of the programme during the reporting period

Attracting foreign guest lecturers is essential in the study process, creating an opportunity for students to get acquainted with other experience in landscape planning, as well as to improve their English language skills. Various financial instruments and opportunities have been used to attract foreign guest lecturers:

- Each study year, as far as possible, foreign guest lecturers are attracted from the **self-earned funds of the Faculty of Environment and Civil Engineering** (tuition fees). For example, since the 2016/2017 academic year, collaboration has been established with Professor Simon Bell of the Estonian University of Life Sciences and the University of Edinburgh (H-index in Scopus 20). Cooperation with Professor S.Bell is very important, because he has been involved in important projects, including the study of Latvian landscapes. The professor has been the President of the Council of European Schools of Landscape Architecture (ECLAS), thus strengthening the international recognition of the specialty of landscape architecture at the Latvia University of Agriculture and cooperation with foreign schools of landscape architecture.
- **NordPlus** and **ERASMUS +** programmes for attracting an average of 3-4 foreign guest lecturers from different countries each year
- **International summer schools** were organized 4 times with the financial support of the State Education Development Agency and in cooperation with the Lifelong Learning Center of

the Latvia University of Life Sciences and Technologies, attracting foreign guest lecturers for various activities, with the possibility also for students to participate in the activities;

- **BOVA** (The Baltic Forestry, Veterinary and Agricultural University Network) and **NOVA** (The Nordic Forestry, Veterinary and Agricultural University Network) programmes for attracting guest lectures from Lithuania, Estonia, Nordic countries and organizing intensive study courses <https://www.bova-university.org/about-bova-university-network>
- Different grants and funds, for example, several scholars and guest lecturers have been involved in **the Swiss grant** (Latvian-Swiss Cooperation Program Grant Scheme "Activities of Swiss Researchers in Latvia" <http://www.projekti.llu.lv/?ri=2206> (in Latvian))
- **LLU development projects** with the possibility to attract foreign guest lecturers (ESF project No. 8.2.3.0/18/A/009 «Improvement of Latvia University of Agriculture management») <https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2018/latvijas-lauksaimniecibas-universitate-s-parvaldibas-pilnveide> (in Latvian))

During the reporting period foreign guest lecturers were attracted from Norway, Sweden, Finland, Poland, Turkey, Germany, Slovakia, Spain, Portugal, Estonia, Lithuania, England, Iceland, Russia. Guest lectures are also given by foreign lecturers, who are cooperation partners of the study program and visit Latvia from Belgium, Scotland, Lithuania and Estonia.

The involvement of **guest lecturers - practitioners from the field of landscape architecture and planning** in the study process is also important, giving students an insight into the latest trends in the field. On average, about 10 guest lecturers from the industry are attracted every year.

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.

A total of 12 lecturers participate in the implementation of the study programme, 10 of them with a doctoral degree and two lecturers with a Master's degree (Fig.9).

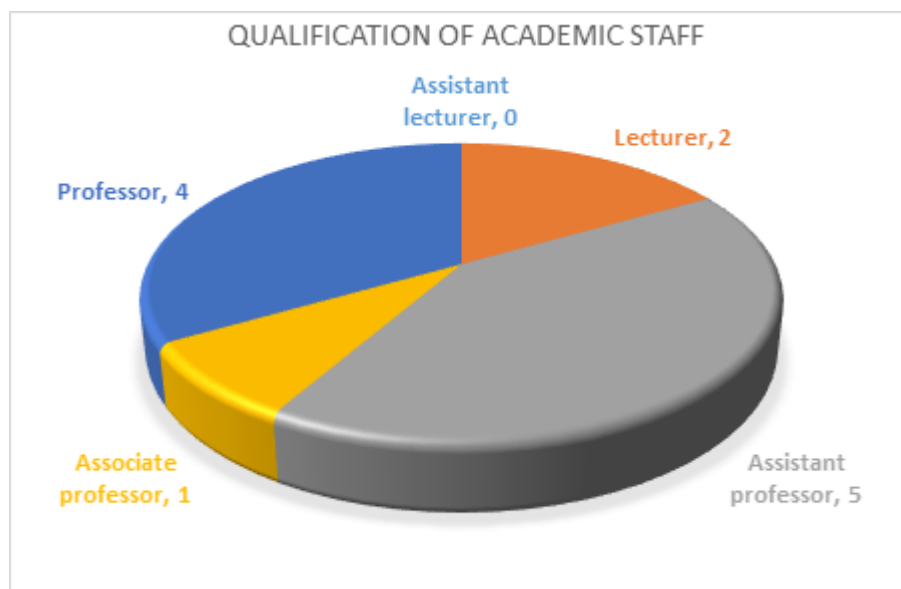


Figure 9 Qualification of academic staff

The study programme complies with the following implementation conditions and requirements of regulatory enactments:

Requirements	Compliance
The qualification of the academic staff involved in the implementation of the study programme complies with the requirements of the Law on Higher Education Institutions regarding the implementation of study programmes in a university-type higher education institutions. The provision set forth in Section 39 of the Law on Higher Education Institutions - <i>"Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught."</i>	has been ensured
The knowledge of the state language of the teaching staff involved in the implementation of the study programme complies with the regulations regarding the scope of knowledge of the state language and the procedure for testing the state language proficiency for the performance of professional and official duties.	has been ensured
The English language skills of the teaching staff involved in the implementation of study programmes taught in English correspond to at least Level B2 (Section 55 of the Law on Higher Education Institutions).	has been ensured
Each member of the academic staff has published articles in peer-reviewed publications , including international publications, in the last six years (in case of a shorter period worked, the number of publications is proportional to the time worked) or creative artistic achievements (such as exhibitions, films, theater performances and concerts), or five years of practical work (except length of service in the implementation of the study programme) in accordance with the Law on Higher Education Institutions	has been ensured

In order to increase their qualification, improve their English language skills, make new contacts for scientific and study process, as well as improve the study programme, the teaching staff goes to

read lectures and exchange experiences within the ERASMUS+ programme (Fig.10). Every year at least 4-6 people from the teaching staff of the department go on exchange programmes. In 2019/2020, mobility and exchanges were not possible due to the pandemic.

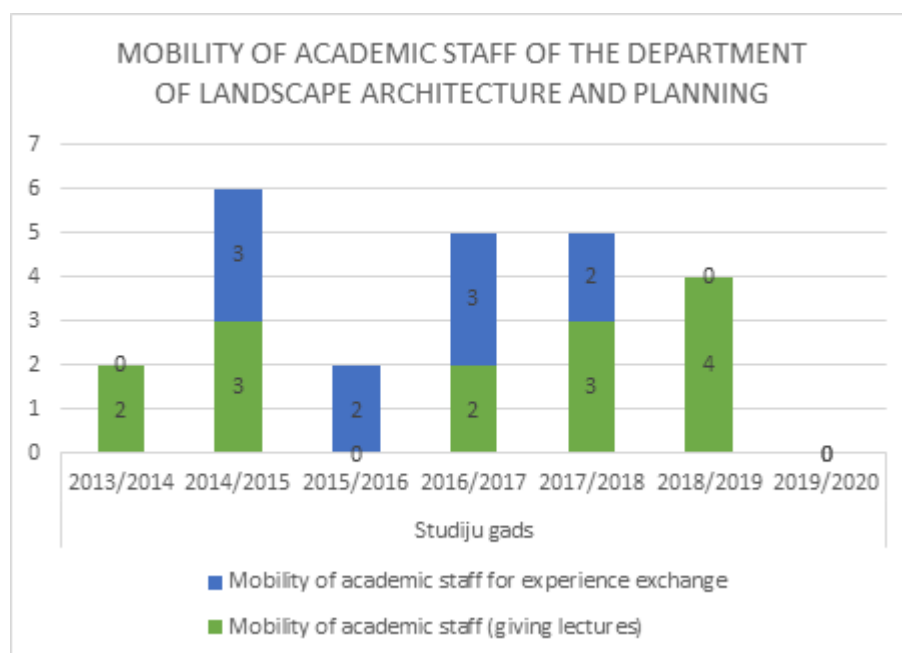


Figure 10. International mobility of academic staff of the programme within the ERASMUS+ program

The **teaching staff participated in the following activities that raised their academic and professional qualifications:**

- Industry professional development courses organized by the industry, ministries, within the framework of separate projects - seminars, courses, discussions, trainings, which cover a wide range of industry topics (regularly);
- English language courses organized by the LLU (regularly);
- University didactics courses attended by all elected lecturers (regularly);
- On LLU e-platforms - Moodle environment training courses for lecturers (regularly);
- ArcGIS specialized course, advanced training (2020);
- Academic Writing for Landscape Architects. BOVA, LLU (2017).

Faculty members are also invited to **participate in projects implemented by ministries or other institutions as experts, give lectures to the industry** - at least 10-15 different lectures each year. In addition, the teaching staff of the department has been implementing the lifelong learning program "*Garden and Landscape Architecture*" (<https://www.mc.llu.lv/node/257> (in Latvian)) or more than 10 years in cooperation with the **Lifelong Learning Center of the LLU**, which is the most demanded course at the LLU and is attended by more than 50 participants each year.

The qualification and contribution of the teaching staff is also noticed by the industry, the state and local governments, presenting the teachers with **awards, letters of commendation and gratitude**. Latvian and international awards and recognitions received during the reporting period:

- Latvian Academy of Sciences, SIA ITERA LATVIJA and RTU Development Fund - seven awards received;
- Letters of Commendation from the Ministry of Agriculture of the Republic of Latvia - 2 Letters of Commendation received;
- European Academy of Sciences and Arts and Latvian Academy of Sciences Award for Young

Scientists (Felix Award);

- Award of the European Council of Landscape Architecture Schools ECLAS;
- Award for the competition "Woman in Architecture and Construction";
- "Zemgales Laiks Ziedonis" for contribution to the development of Zemgale region - three awards received;
- LLU letters of thanks and recognition - at least 5 letters of recognition;
- Recognition of LLU textbooks and study materials;
- Awards of various competition commissions related to plein airs - at least 10 awards;
- Letter of commendation "Volunteer of the Year" for volunteer work in the activities of the Big Cleanup.

International industry organizations and networks where the teaching staff of the department participate:

- IFLA - International Federation for Landscape Architecture
- ECLAS - European Council of Landscape Architecture Schools Lecturer Kristīne Vugule was the secretary of the ECLAS organizing committee from 2009-2015.
- ELASA - European Landscape Architecture Schools Association
- EBANELAS - Eastern Baltic Network of Landscape Architecture Schools
- NORDNATUR network
- Nordic Landscape Research network
- Herity network (International Cultural Heritage Quality Management Assessment)
- NJF - Nordic Association of Agricultural Scientists

In Latvia, the teaching staff work in the following **Latvian- level commissions** :

- Competition "Best Building of the Year" expert commission (regularly)
- Zemgale Regional Student Research Conference - Commission of Expert Evaluation of Competition Papers (every year)
- LAAA Landscape Architecture Certification Commission (regularly)
- Latvian School of Architecture Plein Air Steering Committee (every year)
- ITERA Latvia Scholarship Commission (every year)
- Jelgava City Agency "Culture" Jury Commission at the Sand Sculpture and Ice Sculpture Festivals (every year)
- RTU Faculty of Architecture Geniator XIV.

In the reference period the changes in the academic staff were related to recruitment of younger colleagues who are professionals of the industry and who are able to deliver information to students in a good quality on latest developments in the industry and who provide a close connection with modern landscape architecture environment in Latvia and Europe.

New teaching methods and latest information in the industry were acquired by academic staff members at the international level by participating in international mobility projects or international organizations thus improving the quality of studies with the latest discoveries, IT solutions and updating the necessary provision of the study environment.

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 teaching staff of the Department of Landscape Architecture and Planning has worked on scientific and popular-scientific publications, strengthening the link between research and the study process, as well as the transfer of research results in the field. A total of 231 publications were prepared during the reporting period (*Table 6 and Fig.11*).

Table 6

Publications elaborated by the academic staff of the Department of Landscape Architecture and Planning

Type of publication	Number of publications
International, peer-reviewed scientific publications included in Web of Science or Scopus scientific literature data bases	31
Publications in anonymously-reviewed international scientific publications, incl. proceedings	63
Popular science and methodological publications	35
Materials for international conferences (Abstract) and other articles, publications, doctoral theses	102
Total:	231

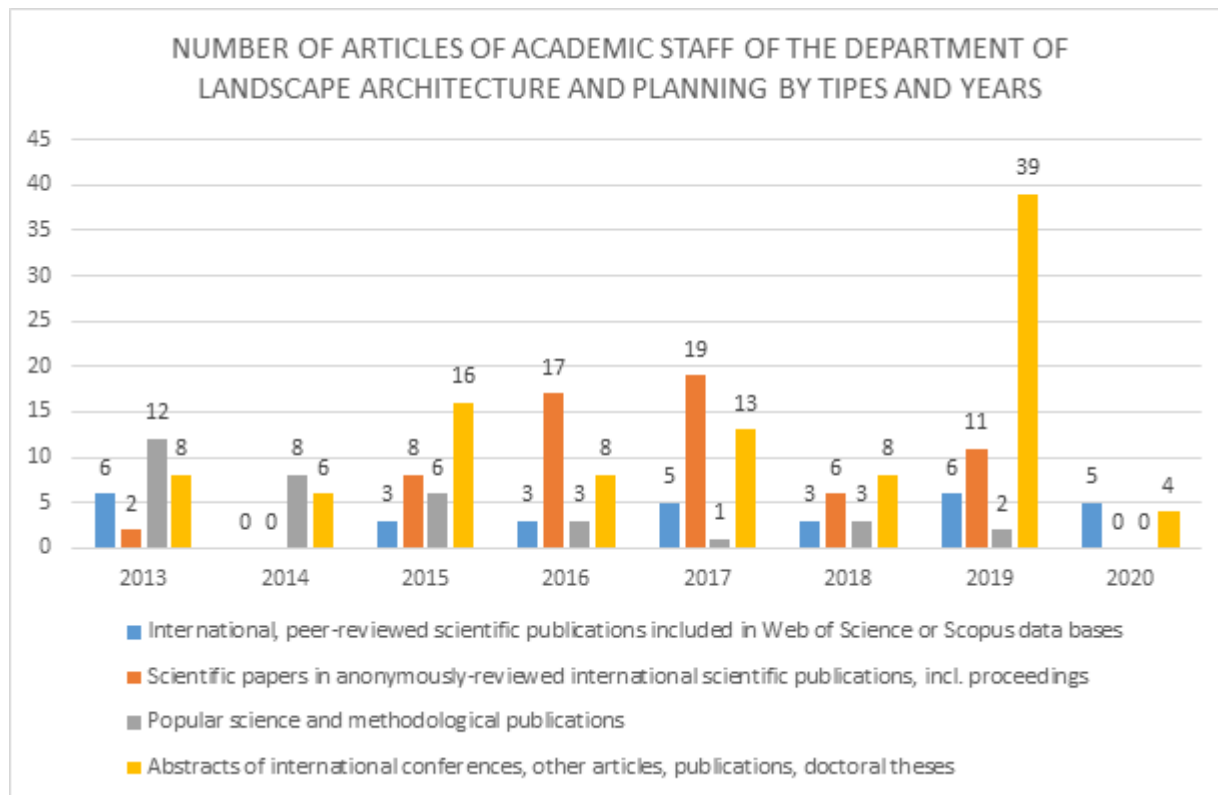


Figure 11. Publications of the academic staff by type and year

The teaching staff and doctoral students of the Department of Landscape Architecture and Planning have been involved in several projects that facilitated the strengthening of scientific capacity and the availability of resources necessary for the implementation of studies and science, the improvement of study programmes, research and the involvement of students in research (*Table 7*).

Table 7

The involvement of academic staff of the Department of Landscape Architecture and Planning in projects, linkage of the results of the projects to study process

Implemented projects	Linking the results of the programme and the application of information in the study process
Latvian national procurements	

<p>Research project of the State Research Program "Sustainable Spatial Development and Rational Use of Land Resources" (No. VPP-VARAM-ITAZRI-2020 / 1-0002) "Sustainable land resource and landscape management: challenges, development scenarios and proposals" (LandLat4Pol). Project implementation: 01.12.2020 - 30.11.2022 https://www.ltu.lv/projekti/apstiprinatie-projekti/2020/ilgtspējīga-zemes-resursu-un-ainavu-parvaldība-izaiņinājumu (in Latvian)</p>	<p>The acquired knowledge and results will serve as a basis for recommendations to policy makers in regard to land use and landscape policy, strategic and spatial planning, the common agricultural policy and environmental protection. Examples of good practice will be prepared for industry professionals and researchers in the project scope. The study will provide new knowledge and solutions needed to develop a balanced use of land resources and sustainable landscape management in Latvia. For the first time in Latvia, comprehensive alternative scenarios and dynamic models for land resource efficiency will be developed, as well as a basis for an interactive landscape atlas.</p> <p>Within the framework of the project, it is planned to involve students, both Master's and Doctoral students. The results obtained during the research will supplement the content of the study programme, as well as increase the qualification and experience of the teaching staff.</p> <p>In addition, in the scope of the project it is intended to create a Master's specialization "Landscape Management".</p>
<p>Implemented international projects</p>	
<p>Interreg Latvia-Lithuania Programme "Sustainable Integration of Novel Solutions into Cultural Heritage Sites/ NovelForHeritage" http://www.vbf.ltu.lv/jaunu-ilgtspējīgu-risinājumu-integrācija-kultūras-mantojuma-sustainable-integration-of-novel (in Latvian)</p>	<p>Within the framework of the project, the attractiveness of Eleja manor park and Žagare manor park for tourists will be increased. Both parks have been designed by landscape architect and gardener G.Kūfalts, who, at the turn of the 19th-20th centuries, was known throughout Europe. The involvement of the Latvia University of Life Sciences and Technologies and the Lithuanian Natural Heritage Foundation in the project will provide a scientific and practical approach that will be of interest to landscape architects.</p> <p>The teaching staff conducts research on the cultural and historical landscape, in cooperation with Lithuanian colleagues, the obtained materials will supplement the scope and content of the study programme.</p> <p>In the project, students participate in the plein air with the aim to create ideas for the development of the planned exhibition hall in Eleja, as well as participated in educational seminars and, additionally, created environmental objects in Eleja park.</p>
<p>Interreg Baltic Sea Region project "Water driven rural development in the Baltic Sea Region" (WATERDRIVE) https://water-drive.eu/about/ https://www.ltu.lv/lv/WATERDRIVE (in Latvian)</p>	<p>Within the framework of the project, it is possible to share experience, access information, promote public involvement in various approaches to address and inform, as well as introduce new and smart management measures on agricultural land. Spatial planning to control the risks of climate change - droughts and floods in downstream agricultural areas - a new risk mitigation system. Within the framework of the project, the task in this activity is to use the assessment of ecosystem services for the assessment of river basin territories, involving the population, as a case study method.</p> <p>In this project, there is cooperation between several departments and scientists both within LLU and at the international level.</p>
<p>Interreg Latvia-Lithuania Programme 2014-2020 project „Creation of Joint GI Education to Increase Job Opportunities in the Region" (No. LLI-206). Project implementation period: 2017-2020. http://gisedu.eu/en</p>	<p>Within the framework of the programme, a training course on the use of ArcGIS software for landscape research, planning and management is planned, which is acquired by lecturers as they improve their qualifications, with the aim of integrating the use of ArGIS into separate study courses in both Bachelor's and Master's degree programmes.</p>

<p>Interreg Latvia-Lithuania Programme 2014-2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions” (BrownReg). Project experts from VBF Departments of Land Management and Geodesy, Environment and Water Management, Landscape Architecture and Planning, Forest Faculty and Faculty of Agriculture. Implementation period 1.03.2018 - 31.08.2019 Project leading partner - LLU, partners - Ludza municipality (LV), Ignalina and Kupiškis municipalities (LT).</p> <p>http://www.vbf.llu.lv/lv/innovative-brownfield-regeneration-for-sustainable-development-of-cross-border-regions-brownreg (in Latvian)</p>	<p>The main activities of the project will include: gathering, implementing and popularizing new knowledge for innovative revitalization of degraded territories, in cooperation with the university and municipalities developing a good practice guide for municipal spatial planners, industry professionals and the public; 3D modeling, site remediation and installation and monitoring of phytoremediation pilot sites for remediation of contaminated soils in degraded areas in Ludza, Ignalina and Kupiškis; public involvement in cleaning up the territories. Based on the promotion of cooperation between scientists and municipalities, the project results will provide an important practical, scientific and informative basis for innovative, environmentally friendly brownfield revitalization approaches that can be used for future projects of revitalization of degraded areas and in the study process.</p> <p>Students were also involved in the project - participating in the Bova course “Degraded Territories”, as well as actively participating in the practical part of the project implementation, as well as participating in the educational events. The handbook developed in the course of the project has been used in the study process.</p> <p>In this project, there was cooperation between several departments and scientists, students.</p>
<p>Latvian-Russian Cross-border Cooperation Program 2014-2020 project “Sustainable Use of Water Resources for Tourism Development in Latvian-Russian Border Towns - Rēzekne and Ostrov” (LV-RU-017) Urban Sticky Areas. Project implementation period: 2019-2021. Students participate in project activities</p> <p>http://www.vbf.llu.lv/lv/udens-resursu-ilgtspejiga-izmantosana-turisma-attistibai-latvijas-krievijas-robezpilsetas-rezekne (in Latvian)</p>	<p>During the project, local tourism actors will receive training in marketing, cooperation (clustering), tourism relations with sustainable management and natural resources. The project partners will develop research on water basins in Rēzekne and Ostrov, create materials for sustainable waterfront tourism routes. An integrated handbook on natural resource management and a common cross-border approach to the integrated natural resources management study process will be developed. Improvements will be made on the banks of two reservoirs, which will have a positive impact on the increase in the number of visitors to the improved natural objects of the Programme area.</p> <p>Bachelor's and Master's students participate in the project in several study courses - “Landscape Sociology” - researching the project territory, study course “Landscape in Focus”, developing interactive routes of Rēzekne River - Ecoquest <i>(in cooperation with LLU IT faculty students)</i>.</p> <p>In this project, there was cooperation between several departments and scientists, students.</p>

<p>In connection with the Latvian Association of Landscape Architecture (LAAB), the following project is being implemented: Leonardo da Vinci exchange program for the independent professional development of landscape architects in the Baltic Sea region CPD-LA (No. LLP-LdV-TOI-2013-LT-0138-P2). Project period: 01.09.2013 - 01.09.2015 Partners involved: Vilnius Gediminas Technical University (Lithuania, VGTU), Lithuanian Association of Landscape Architects (Lithuania, LALA), Latvian Association of Landscape Architects (Latvia, LAAB), German Federation of Landscape Architects (Germany, BDLA).</p>	<p>The project is based on 4 partners who transfer an innovative vocational education and training program (VET) with continuous professional development (CPD) working in the field of landscape architecture. The project donor country - BDLA (Germany) provides information, training and exercises on quality assessment methods in landscape architecture to other partners through the Continuing Professional Development System (CPD). Recipients of information and training: Lithuanian Association of Landscape Architects (Lithuania, LALA), Latvian Association of Landscape Architects (Latvia, LAAB), as well as Vilnius Gediminas Technical University (Lithuania, VGTU), which envisages adaptation of project management and methodological materials. In the project, LLU cooperates with the industry, Lithuanian colleagues and German colleagues, strengthening cooperation, as well as developing various industry training materials, organizing seminars, field trips and discussions. A separate training course has also been developed, its materials are integrated into the study process.</p>
<p>Eastern Baltic Network of Landscape Architecture Schools - a network of landscape architecture schools in the Baltic and Eastern European countries, which aims to compare study programmes between Latvian, Lithuanian, Estonian, Swedish, Norwegian universities and adapt them to the EFLA (European Federation of Landscape Architects) educational standard or landscape architecture. https://www.facebook.com/pg/Ebanelas-205603633183585/about/</p>	<p>In co-operation with the Baltic and Scandinavian countries, the directors of the study programme worked on the improvement of the study programmes in accordance with the educational standard developed by the European Council of Landscape Architecture Schools. https://www.eclas.org/eclas-education-guide/ As a result of the project, changes in the study programme were prepared and analyzed, which were later also implemented.</p>
<p>Project of the European Economic Area Financial Instrument Program "National Climate Policy" "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" (agreement No.2 / EEZLV02 / 14 / GS / 062/002). http://www.eklimats.lv/index.php/lv/ (in Latvian)</p>	<p>Thanks to the State Regional Development Agency Decision on the European Economic Area Financial Mechanism 2009 - 2014, the program "National Climate Policy" small grant scheme project "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" was approved and the LLU Faculty of Environmental and Civil Engineering worked on the modernization of several study courses and their development in the form of e-studies. The overall aim of the project is to improve the availability of information on the effects of climate change and mitigation tools in rural areas. The overall direct goal is to develop high-quality electronic learning modules on climate change and mitigation tools in rural areas, thus improving the transfer of information from research to the study process. In this project, there was cooperation between several departments and scientists, students.</p>
<p>Implemented contracts in cooperation with local governments</p>	
<p>A thematic plan "Concept of Daugava river landscape in Aizkraukle" has been developed. Commissioning party - Aizkraukle Municipality Council.</p>	<p>Both lecturers and students are involved in the implementation of the project, working on the research of the territory, as well as the development of the development concept and gaining practical experience. The methods developed in the project are integrated in the study process.</p>
<p>A concept for the development of greenery and facilities for the territory has been developed for the Pauls Stradiņš' Clinical University Hospital. Commissioning authority - VSIA "Paula Stradiņa Klīniskā universitātes slimnīca";</p>	<p>The teaching staff carried out research work, obtaining additional materials for the implementation of study courses. Later, this area was also developed as a Bachelor's thesis. The methods developed in the project are integrated in the study process.</p>

<p>The thematic plan “Landscape concept for Ikšķile city and villages” has been developed. Commissioning party - Ikšķile Municipality Council.</p>	<p>The teaching staff carried out research work, obtaining additional materials for the implementation of study courses. Within the framework of the project, students developed improvement projects for one of the territories. The methods developed in the project are integrated in the study process.</p>
LLU program projects	
<p>“Improvement of LLU academic staff” https://www.llu.lv/projekti/apstiprinatie-projekti/2019/llu-akademiska-personala-pilnveidosana (in Latvian)</p>	<p>During the project, in each of the study directions, the following has been implemented: traineeship of the academic staff with entrepreneurs in order to promote closer connection of the study process with the national economy and to increase the competence of the teaching staff; increased level of English language skills of the academic staff in order to promote the development of new study programmes, attract foreign students and increase professional performance; improved leadership and communication skills of the academic staff in order to ensure more efficient and modern study process, efficiency and quality of work performance; doctoral students are engaged to study direction in order to promote the implementation of human resources renewal and succession plans; foreign academic staff has been engaged to the study fields in order to more effectively ensure the achievement of the basic goals of the LLU and to approach its vision faster - to become one of the leading universities of science and technology in the Baltic Sea region.</p>
<p>"Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision." https://www.llu.lv/projekti/apstiprinatie-projekti/2017/llu-un-tas-parraudziba-esoso-zinatnisko-instituciju (in Latvian)</p>	<p>The aim of the project is to increase the scientific research and innovation capacity of LLU and the ability to attract external funding by investing in human resources and infrastructure.</p>
<p>Modernization of LLU STEM study programmes https://www.llu.lv/projekti/apstiprinatie-projekti/2017/llu-stem-studiju-programmu-modernizacija (in Latvian)</p>	<p>During the project, the premises, auditoriums, computer classrooms and laboratories necessary for the implementation of STEM study programs will be repaired, equipped and modernized. The infrastructure of the Fundamental Library of the LLU has been improved and modernized. In order to improve the knowledge of students and lecturers and to achieve the results of the study programmes, the range of available literature with printed and e-books will be expanded. Modernization of the unified management LLU Wi-Fi network will be performed, including software renewal, expansion of Blade type server park with server software to ensure study process, expansion of disk array capacity for information storage and circulation, LLU network equipment, network functionality expansion, purchase of antivirus software, extension of firewall software functionality, emergency generator power supply solution for data center.</p>

<p>ESF project No. 8.2.3.0/18/A/009</p> <p>“Improvement of the Management of Latvia University of Life Sciences and Technologies”</p> <p>https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2018/latvijas-lauksaimniecibas-universitates-parvaldibas-pilnveide (in Latvian)</p>	<p>The aim of the project is to improve the quality of the content of LLU study programmes and, using the available resources effectively, to ensure better management of the higher education institution and increase of competencies and skills of the management staff.</p> <p>Within the framework of the project, the content of the existing study programmes was improved and adjusted to the needs of the development of the field; evaluation and improvement of the functions of the organizational and management structures of the university; improvement of the university quality management system; development, improvement and implementation of e-solutions for management and internationalization needs; improvement of knowledge, skills and competencies of university management staff; international peer-review and updating of the change plan.</p>
<p>LLU programme “Strengthening of scientific capacity at LLU” project “Road landscape modeling”, agreement No. 3.2.-10/50.</p>	<p>The aim of the programme is to promote the development of the priority research directions defined in the LLU science development strategy and the development of appropriate doctoral theses.</p>
<p>LLU program “Strengthening the scientific capacity of LLU” project “Industrial heritage landscape on the Western coast of the Baltic Sea in Latvia”, agreement No. 3.2.-8/58.</p>	<p>Within the framework of the programme, two doctoral researches are supported, which are important for the development of science and connection with the study process.</p>

In addition, 4 lecturers of the Department of Landscape Architecture and Planning have acquired and regularly maintain the rights of LZP (*Latvian Council of Sciences*) experts, and a joint Council of Professors of Architecture at RTU and LLU has been established.

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).

Various principles of cooperation have been observed in the acquisition of the study programme:

- The **principle of succession** of separate study courses - knowledge, skills and competencies are acquired gradually, thus the study courses are connected sequentially - the acquisition of separate parts is possible only after the acquisition of the previous subject. The principle of succession of study courses has been developed and observed in cooperation with the lecturers;
- **Thematic and content connection** of study courses (*Fig.12*) - implemented by creating a continuation of separate tasks in other courses or by including the previously acquired knowledge. For example, in order to prepare for the Traineeship I study course and perform the practical tasks, it is necessary to acquire the Theory of Landscape Architecture study course, gaining theoretical knowledge about the research issues of the discipline, as well as the principles of structuring the research work in the Research Basics study course;
- **Management and evaluation of large-scale course projects and exams** takes place in cooperation with several lecturers, because the implementation of large-scale study courses

involves at least 2-3 lecturers, which helps to cover all the necessary knowledge and to evaluate students' works as objectively as possible. There is a continuous and close cooperation of lecturers in such study courses.

- Evaluation of teaching staff cooperation is performed by the director of the study program, who regularly receives not only content but also structure evaluation from students' about study course (using LLU IS system evaluation tools), as well as department meetings, discussing cooperation principles and cooperation promotion mechanisms between lecturers, acquisition of versatile and purposeful study course material, combining it with practical tasks. Such discussions at the department take place at the end of each study semester

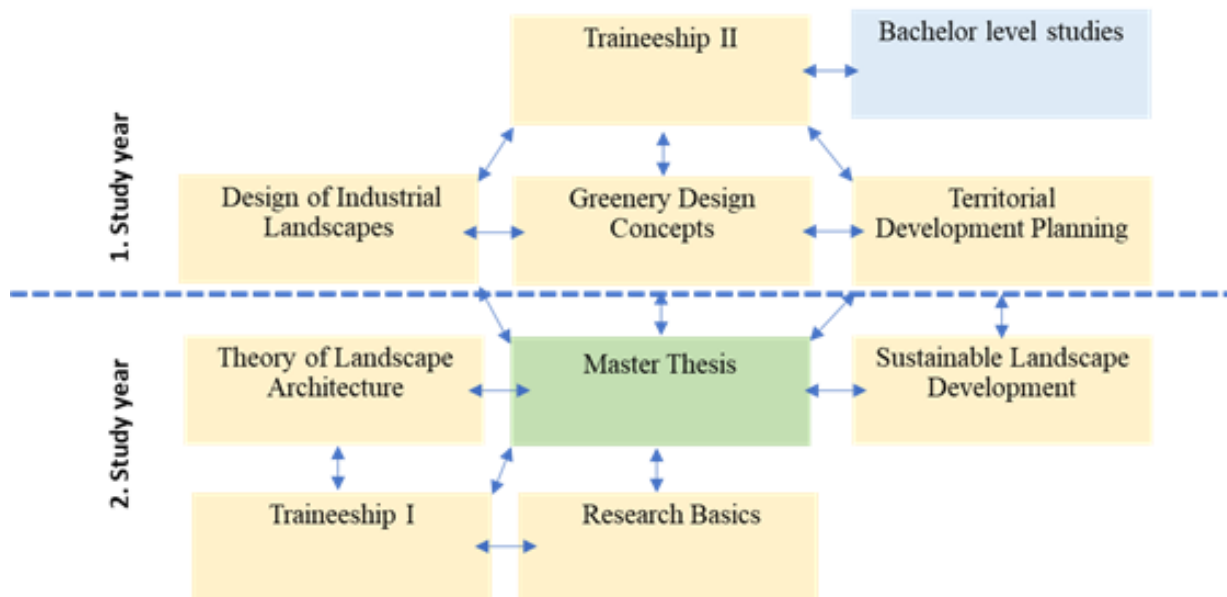


Figure 12 Thematic and content connection of study courses

The majority (85%) of the academic staff is elected staff, which ensures staff stability. 12 people are involved in the implementation of the study programme, who realize 3.56 full-time positions. A total of 28 students are studying in the study program on 01.01.2020, thus **the number of students and staffing ratio** is 7.9, which is lower than the LLU average (13.2). It must be concluded that some lecturers teach only specific study courses for which they specialize, therefore they do not have a large workload or they teach this course in several study programmes. A total of 3269.86 study working hours are provided for the implementation of the study programme. Most of the study programmes are implemented by lecturers with a doctoral degree (*professors, associate professors and assistant professors*).

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	2_appendix_AAP_MAG_statistics_students_ENG.pdf	2_piel_AAP_MAG_studejoso_statistika_LV.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	1_appendix_compl_with_education_standard.pdf	1_piel_atbilstiba_izglitiba_standartam.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable)	3_appendix_compl_with_professional_standard.pdf	3_piel_atbilstiba_profesijas_standartam.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	5_appendix_mapping_study_courses.rar	5_piel_kursu_kartejums.rar
Curriculum of the study programme (for each type and form of the implementation of the study programme)	4_appendix_study_plans.rar	4_piel_studiju_plani.rar
Descriptions of the study courses/ modules	6_appendix_description_study_courses.rar	6_piel_studiju_kursu_apraksti.rar
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	AAP_MAG_2G_1G_ENG.rar	AAP_MAG_2G_1G_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	agreement_RTU_LL.U.rar	vienosanas_RTU_LL.U.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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		
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.		

Civil Engineering (41582)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Civil Engineering</i>
Education classification code	<i>41582</i>
Type of the study programme	<i>First level professional higher education study programme</i>
Name of the study programme director	<i>Sandra</i>
Surname of the study programme director	<i>Gusta</i>
E-mail of the study programme director	<i>sandra.gusta@llu.lv</i>
Title of the study programme director	<i>Dr.oec.</i>
Phone of the study programme director	
Goal of the study programme	<p><i>The aim of the first level professional higher education programme Civil Engineering is to prepare specialists in the field of construction:</i></p> <ul style="list-style-type: none"> <i>• in accordance with the requirements of the labor market;</i> <i>• according to the first level professional higher education (LR higher professional education standard;</i> <i>• ensuring the acquisition of knowledge, skills and competences by training comprehensively educated construction specialists (building construction managers), promoting their development into mentally and physically developed, free, responsible and creative personalities in order to promote their competitiveness in changing socio-economic conditions and who:</i> <ul style="list-style-type: none"> <i>- be able to perform complex contractor work, as well as organize and manage construction-related work, in accordance with legislation and regulatory enactments;</i> <i>- promote motivation for further education in order to obtain 2nd level higher education and 5th level professional qualification in civil engineering.</i> <i>• to create an opportunity for working construction specialists with long-term practice and/or construction management certificate to obtain a fourth level professional qualification.</i>

Tasks of the study programme	<ul style="list-style-type: none"> • <i>To prepare students for the use of their theoretical knowledge, skills and abilities in civil engineering and related fields.</i> • <i>To provide a wide range of knowledge and understanding of the organization and management of construction work, applicable work execution technologies.</i> • <i>To develop and strengthen the skills and abilities of self-education and permanent work in order to create motivation for further education - in the professional bachelor's study programme Civil Engineering, but later also in the professional master's programme.</i> • <i>To enable the student to acquire the theoretical knowledge and practical skills provided for in the programme, so that after obtaining the qualification of a building construction manager they would be able to work successfully:</i> <ul style="list-style-type: none"> - <i>in construction companies;</i> - <i>in the design of buildings and structures as technicians;</i> - <i>in pedagogical work and advisory services at various levels and structures;</i> - <i>in building materials and building construction companies;</i> - <i>in building materials and construction trade companies;</i> - <i>in the administrative state, public and private structures managing and controlling construction;</i> - <i>in building maintenance and repair companies;</i> - <i>in real estate appraisal and trading firms;</i> - <i>in water supply and sewerage system reconstruction and construction companies;</i> - <i>in construction companies managing various construction processes;</i> - <i>in the design and technical inspection of buildings and structures.</i> • <i>To provide an opportunity to receive the theoretical knowledge and the latest knowledge in the field, as well as strengthen self-education skills for already construction specialists with many years of practice and / or construction management certificate.</i>
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Results of the study programme	<p>Knowledge:</p> <ul style="list-style-type: none"> • students are able to demonstrate comprehensive knowledge and understanding of facts, theories, relationships and technologies in civil engineering and civil engineering entrepreneurship in accordance with the qualification of a Building Construction Manager. <p>Skills:</p> <ul style="list-style-type: none"> • students are able to observe civil engineering regulatory enactments; develop and analyze construction drawings; apply civil engineering terminology; create databases; ensure production hygiene requirements, fire safety rules and requirements; to apply occupational safety and environmental protection legislation, management and cooperation psychology; • students are able to develop project documentation as a part of qualification thesis, to develop a project of work performance; they know civil engineering technology and construction work management, organization and planning; they know the properties of building materials and are aware of availability, suitability and costs of building materials; the essential requirements for structures of buildings; the structural solutions of buildings; the organization and planning of construction work, the economical use of financing and material resources, to implement quality management of construction works, they know geodetic and metrological works; draw up executive documents, perform civil engineering entrepreneurship; • students are able to communicate, establish business relations with customers and their representatives, an employer and subordinates; manage a working group; to analyze and solve problem situations; to plan, coordinate, manage their own and others' work; develop and manage projects; they know quality, systems, regulations of labour safety and environmental protection; the legislation. <p>Competencies:</p> <ul style="list-style-type: none"> • students are able to define, describe and analyze practical problems on the construction site, when organizing construction work; • students are able to select the required information and apply it in order to solve accurately defined problems; • students are able to participate in the development of the construction industry, to show that they understand the role of a building construction manager in a wider social context.
Final examination upon the completion of the study programme	Successful acquisition of the study program, developed and defended qualification work.

Study programme forms

Part time extramural studies - 3 years, 6 months - latvian

Study type and form	Part time extramural studies
Duration in full years	3
Duration in month	6
Language	latvian

Amount (CP)	120
Admission requirements (in English)	<i>General secondary education or vocational secondary education</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	-
Qualification to be obtained (in english)	<i>Building Construction Manager</i>

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 First level professional higher education study program Civil Engineering was developed and licensed in 2015. The need for the establishment of the first level professional higher education program Civil Engineering at the Latvia University of Life Sciences and Technologies was determined by the new Construction Law adopted in 2013, which entered into force on October 1, 2014. The changes included in the new Construction Law significantly affected a great part of the certified construction managers working in the sector, as one of the most significant changes is related to the requirements of higher education level for those working in the sector. The new law affected the fact that construction managers already working in the sector with vocational secondary education were no longer allowed to continue in this position. Compared to the previous law, it was also possible to work as a construction manager with a vocational secondary education. For this reason, more than 1,500 working construction managers in the sector after 2018 could remain without the right to practice. As a result, the demand for first level professional higher education in civil engineering increased, which allows to obtain the qualification of a construction manager and to continue working in the industry. In compliance with the LR Construction Law, a study carried out by specialists of the Latvian Civil Engineering Union (LBS) on prospects for construction development, and given that **LLU has all the prerequisites for the acquisition of adequate education**, including significant experience in the implementation of civil engineering education more than 45 years and well-developed study and science infrastructure, the first level professional higher education study programme Civil Engineering was developed.

The programme is intended both for existing construction managers, who due to changes in the Construction Law require first level professional higher education, as well as for future construction managers without previous experience in the field of construction management. The graduates of the program have the opportunity to continue their studies in the Professional bachelor's study program Civil Engineering and obtain the professional qualification of a Building Civil Engineer by entering the program in the later stages and performing the academic recognition of the acquired study courses. In the established the First level professional higher education study program "Civil Engineering" the studies have been started in the spring semester of the 2014/2015 study year, matriculating 28 students in the 1st year.

During the last three years, at the national level, the Ministry of Economics, in cooperation with professional organizations in the field (Latvian Civil Engineering Union (LBS), Latvian Builders' Association (LBA), etc.), has been intensively working on development and improvement of **the map of professions included in the civil engineering sector**, which marks the professions and specialists currently needed for the industry at different levels of education. Consequently, work is currently underway to clarify the standards of the professions included in the map or to develop new standards for upcoming professions. This has also been taken into account in the refinement and revision of the program to bring it into line with new initiatives and revised standard of

professional qualification, that has been changed from a Construction Manager to a **Building Construction Manager**. Updated professional qualification standard "Building Construction Manager" has been submitted for an approval to the National Centre for Education of the Republic of Latvia and planned to be approved till the end of November, 2021.

Due to these new initiatives, **the qualification to be awarded in the study programme was specified**, which was changed from the qualification of Construction Manager and *Building Construction Manager*. The changes are based on upcoming approval of the new profession qualification standard of Building Construction Manager (the latest version of new standard is available in the *Appendix No.1* (only in Latvian)). Therefore, all further comparisons with the parameters of the first level professional higher education study programme Civil Engineering are performed in line with the new standard of professional qualification of a Building Construction Manager.

The implementation form of the study programme is specified to "*Part time extramural studies*", because the implementation form "Part time intramural studies" indicated in the existing accreditation sheet of the study direction has never been implemented by LLU in this study program. It is technical mistake in the accreditation sheet and has not been corrected during the reporting period.

Other parameters of the study program have not changed since the last accreditation and licensing of the study programme in 2014.

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 **total number of students** in the reporting period varies from 40 to 98 students (*Fig.1*). Studies are implemented only as part-time studies. Taking into account that the first level professional higher education study programme Civil Engineering does not provide state-funded study places and it is a paid programme, as well as the fact that most students already work in the field in parallel with studies, the demand for full-time studies is not expressed. This is also in line with the current situation in the country, where priority young people choose full-time, state funded studies immediately after graduating from a school. Therefore, due to low interest in full-time studies in the programme, the full-time studies have not been implemented so far. The **number of students enrolled** in part-time studies varies from 17 to 28 willing to study, but in the first year an average of 26 students have concluded study agreements. In the first years, due to the great interest, the admission to the 1st year took place in both the autumn and spring semesters. With demand leveling off, admission currently takes place only in the autumn semester. In general, the fluctuations in the number of students enrolled over the years are mainly related to the overall situation in the building sector, which is extremely sensitive to changes in the economic situation in the country, as well as one of the slowest recovering from economic crisis. With the deterioration of the economic situation, the number of students in basic studies has decreased, while with the development of the industry, the need for specialists is increasing, which in turn influences the choice in favor of studies in the field of civil engineering.

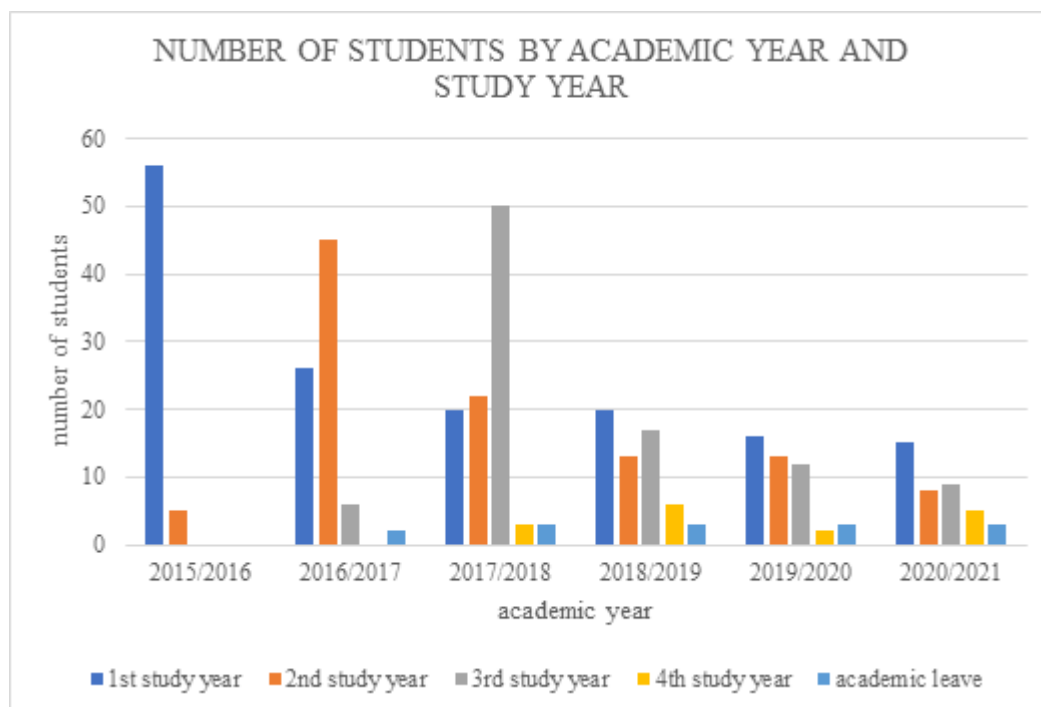


Figure 1 Number of students by academic year and study year

Analyzing the **dropout level of students**, a relatively large decrease in number of students is formed when moving from the first year to the second, also in the last year of studies. This is mainly due to non-fulfillment of the requirements of the study program, as well as non-fulfillment of financial obligations. Another reason is non-return from academic leave, as well as non-registration for studies for the next academic year. Students who do not meet the requirements of the study programme within a certain period of time often continue to work in production and, due to workload and financial difficulties, choose not to continue their studies, but in most cases to postpone them indefinitely. Several students go abroad for a profit to return later and continue their studies. Often, it is precisely those students who, for various reasons, have been forced to drop out of their studies that **resume their studies at later stages with significantly greater motivation and practical work experience**. Overall, about 10 to 14 students resume their studies at later stages each year.

In some situations, students discontinue their studies because they have not been able to successfully complete one of the study courses within the study programme. In this situation, students are offered the opportunity to **transition from student status in the programme to listener status at the LLU Lifelong Learning Center**, which is actively used by some students. The status of a listener allows to acquire only those study subjects which, due to various reasons, have not been acquired as a student in the study programme, and due to which it is not possible to register a student for further studies for the next study year. After successful completion of these individual study courses, students can resume their studies. More full-time students use this opportunity to return to a state-paid place of study faster, which is only possible by studying without study debts. From the part-time first level professional higher study programme Civil Engineering in the reporting period, a total of 15 students were registered as listeners of study courses in separate study courses at the Lifelong Learning Center of the Latvia University of Life Sciences and Technologies. It is a great opportunity for students to choose the most appropriate type of study.

The research of the Ministry of Economics on the development of the labor market in the civil engineering sector shows the need for specialists of various levels in civil engineering in the coming years. Against this background, **the industry is working together to promote the civil**

engineering specialty among young people by launching a "*Learn Civil Engineering*" campaign, in which civil engineering companies meet with schoolchildren to introduce the profession of a civil engineer. Educational institutions that implement various levels of civil engineering education, including LLU, are also involved in this campaign. Cooperation also takes place with technical schools and secondary schools, where curricula related to civil engineering are implemented, for example, Saldus Technical School, Jelgava Technical School, Jelgava Secondary School of Technology, etc.

LLU is the only higher education institution in Latvia that **offers graduates of the first level professional higher education study programmes Civil Engineering to enter the LLU professional bachelor's study programme Civil Engineering in the later stages** and within 2 or 3 years, obtaining the qualification of a Building Civil Engineer. Such an opportunity is available both for the graduates of the first level programme of the Latvia University of Life Sciences and Technologies, as well as for the graduates of the first level professional higher education study programmes of the Riga Building College (RCK), Rezekne Academy of Technologies (RTA) and Vidzeme University of Applied Sciences (ViA). This is also confirmed by the cooperation agreements concluded with these universities. Statistical data on students of the first level professional higher education study programmes Civil Engineering is available in the *Appendix No.2*.

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 first level professional higher education study programme Civil Engineering reflects the normative framework and multifaceted nature of the construction industry, which is included in the study programme plan in the form of study courses and topics. The civil engineering specialty implemented by LLU has more than 45 years of experience in civil engineering education, initially developing as a field of agriculture / rural building. Currently, studies also look at the general principles of civil engineering, but in cooperation with the LLU's Agriculture, Forest, Engineering, Information Technology Faculties, the initial agricultural construction sector has developed in a diverse way, not only by looking at the solutions of agricultural buildings, but also the use of wood in construction and the new use of various bioresources (flax, hemp, wood materials, etc.), the development of innovative composite materials and the research of their properties, etc. **Studies and research at all levels include several unique directions, which in Latvia are learned and studied in depth only at LLU.** These are the design of agricultural buildings, hydraulic construction, land reclamation structures, wooden constructions and structures of wooden buildings, the use of timber and other bioresources in the development of innovative building materials, acoustics. LLU **implements studies in the field of civil engineering at four education levels** (first level, bachelor's, master's, doctoral), ensuring mutual succession and the possibility to continue studies at a higher level.

The study programme has been developed in compliance with the requirements of the Law on Higher Education Institutions and the Law on Vocational Education, the Regulations of the Professional Standard and the Regulations of the Cabinet of Ministers of the Republic of Latvia No. 141. from 20 March 2001 "*Regulations on the Acquisition of State First Level Professional Higher Education*", which ensures the acquisition of the fourth level professional qualification (*Appendix No.3*). Clause 5.¹ of the Cabinet of Ministers of the Republic of Latvia Regulation No. 141 has been

fulfilled, which envisages the inclusion of a module for the development of professional business competencies in the compulsory content of first level professional higher education courses (organization and establishment of companies, management methods, basics of project development and management, record keeping and financial accounting system, knowledge of the development of social dialogue in society and regulatory enactments regulating labor relations). The module will be implemented mainly with competency training, business games and similar practical teaching methods. The module shall be included in all programs for a minimum of six credit points."

The study programme ensures the training of **Building Construction Managers** of 4th level professional qualification (*Appendix No.4*) in accordance with the requirements of the labor market, who can perform complex work of a contractor, as well as organize and manage construction works in accordance with legislation. The programme is developed in accordance with the European Qualifications Framework (EQF) level 5 knowledge, skills and competence descriptions. Scope of the study programme is 120CP. Part-time distance studies, which are 3.5 years, are currently being implemented. Graduates of the programme obtain first level professional higher education in accordance with the standards of higher professional education of the Republic of Latvia and 4th level professional qualification "Building Construction Manager". The study programme envisages the acquisition of fundamental sciences, technical, economic and humanitarian subjects corresponding to construction management in lectures, practical classes, traineeship and independent studies.

The aim of the education is to create and develop a professional personality capable of thinking and creating and accurately executing, which could solve construction-related problems at the level of the building construction manager and construction supervisor. **The aim** of the first level professional higher education programme Civil Engineering is to prepare specialists in the field of construction:

- in accordance with the requirements of the labor market;
- according to the first level professional higher education (LR higher professional education standard);
- ensuring the acquisition of knowledge, skills and competences by training comprehensively educated construction specialists (building construction managers), promoting their development into mentally and physically developed, free, responsible and creative personalities in order to promote their competitiveness in changing socio-economic conditions and who:
- be able to perform complex contractor work, as well as organize and manage construction-related work, in accordance with legislation and regulatory enactments;
- promote motivation for further education in order to obtain professional bachelor's education and 5th level professional qualification in civil engineering – qualification of a Building Construction Manager;
- to create an opportunity for working construction specialists with long-term practice and/or construction management certificate to obtain a fourth level professional qualification.

In the admission rules of the program, emphasis is placed on the assessments of mathematics and physics after graduating from high school. It leads to the selection of students with the ability to think exquisitely appropriate to the engineering direction. During the studies, students acquire the knowledge necessary for the design of residential, industrial, agricultural buildings and structures, hydraulic structures, civil engineering, real estate appraisal, starting a business in building sector, development and sale of building materials, organization and management of construction and design works, where knowledge of exact and natural sciences is essential. Graduates of the study program become building construction managers, which correspond to the

4th professional qualification level (4th PKL) and 5th level of the Latvian Qualifications Framework (5.LKI). Students have the opportunity to transfer from the first level professional higher education study programme Civil Engineering (part-time studies) to the later stages of the professional bachelor study programme Civil Engineering and obtain the qualification of a Building Civil Engineer in two or three years. Taking into account that the majority of students in the programme are already construction managers with many years of practice and / or with the construction management certificate, then the studies are an opportunity to receive the theoretical knowledge and the latest knowledge in the field, as well as strengthen self-education skills.

The tasks and results of the study programme are aimed at obtaining the qualification of a building construction manager, which envisages:

- To prepare students for the use of their theoretical knowledge, skills and abilities in construction and related fields.
- To provide a wide range of knowledge and understanding of the organization and management of construction work, applicable work execution technologies.
- To develop and strengthen the skills and abilities of self-education and permanent work in order to create motivation for further education - in the professional bachelor's study programme Civil Engineering, but later also in the professional master's programme.
- To enable the student to acquire the theoretical knowledge and practical skills provided for in the programme, so that after obtaining the qualification of a building construction manager they would be able to work successfully in: construction companies; design of buildings and structures as technicians; pedagogical work and advisory services at various levels and structures; construction materials and building construction companies; building materials and construction trade companies; administrative state, public and private structures managing and controlling construction; building maintenance and repair companies; real estate appraisal and trading firms; water supply and sewerage system reconstruction and construction companies; construction companies managing various construction processes; design and technical inspection of buildings and structures.
- To provide an opportunity to receive the theoretical knowledge and the latest knowledge in the field, as well as strengthen self-education skills for already construction specialists with many years of practice and / or construction management certificate.

Studies in the specialty of civil engineering at LLU are practically oriented, providing competence-based education, because lecturers and doctoral students are closely connected with the practice, working in companies or performing research for entrepreneurs. In cooperation with alumni - entrepreneurs, study tours to companies, factories, guest lecturers from industry and traineeship both abroad and in the best Latvian civil engineering organizations, design and construction supervision companies (e.g. AS UPB, Skonto Plan, SIA Zemgales tehnoloģiskais centrs, etc.) are regularly provided.

Upon graduating from the first level professional higher education study programme Civil Engineering, the intended tasks of the program have been fulfilled, the **learning outcomes** have been achieved:

Knowledge:

- students are able to demonstrate comprehensive knowledge and understanding of facts, theories, relationships and technologies in civil engineering and civil engineering entrepreneurship in accordance with the qualification of a Building Construction Manager.

Skills:

- students are able to observe civil engineering regulatory enactments; develop and analyze

construction drawings; apply civil engineering terminology; create databases; ensure production hygiene requirements, fire safety rules and requirements; to apply occupational safety and environmental protection legislation, management and cooperation psychology;

- students are able to develop project documentation as a part of qualification thesis, to develop a project of work performance; they know civil engineering technology and construction work management, organization and planning; they know the properties of building materials and are aware of availability, suitability and costs of building materials; the essential requirements for structures of buildings; the structural solutions of buildings; the organization and planning of construction work, the economical use of financing and material resources, to implement quality management of construction works, they know geodetic and metrological works; draw up executive documents, perform civil engineering entrepreneurship;
- students are able to communicate, establish business relations with customers and their representatives, an employer and subordinates; manage a working group; to analyze and solve problem situations; to plan, coordinate, manage their own and others' work; develop and manage projects; they know quality, systems, regulations of labour safety and environmental protection; the legislation.

Competencies:

- students are able to define, describe and analyze practical problems on the construction site, when organizing construction work;
- students are able to select the required information and apply it in order to solve accurately defined problems;
- students are able to participate in the development of the construction industry, to show that they understand the role of a building construction manager in a wider social context.

Upon graduating from the first level professional higher education study programme Civil Engineering:

- young people interested in civil engineering receive an education that provides them with the opportunity to become building construction managers, then be able to organize and manage and control construction-related work, as well as, after acquiring additional knowledge in research in the 2nd level professional higher education study programme, continue education in master's degree to work in scientific and pedagogical work in the chosen specialty;
- public institutions and private structures operating in the field of civil engineering shall receive professionally educated specialists who are well-versed in issues related to their profession, are able to join the family of professional building construction managers and construction supervisors;
- the acquired education creates preconditions for successful cooperation with foreign partners in matters related to civil engineering at the level of construction managers and construction supervisors;
- the acquired education ensures high competitiveness in the local and international labor market;
- employees who want to continue their education can obtain first level professional education in civil engineering without interrupting their professional work, so that after proving professional practice, they can obtain a construction manager's or construction supervisor's certificate, but later study professional bachelor's study programme Civil Engineering in later stages and become a Building Civil Engineer.

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.

In recent years, active work has been carried out on the development of profession maps and profession standards in the field of construction. The work of an expert group on a new professional standard **Building Construction Manager** is currently being elaborated by the working group from the industry. New profession standard includes a detailed presentation of the knowledge, skills and competences needed for each of the duties and tasks defined in the labor market. According to the professional standard "Building construction manager is a natural person who plans and manages the implementation of specific building construction sites based on project documentation, building contract implementation conditions, laws and regulations of the Republic of Latvia, Latvian state standards and technical regulations, as well as European Union and international regulations' legal norms, plans the co-operation of all participants involved in the implementation of the building object and the procedure for the performance of construction work, takes the necessary measures for quality assurance and work safety in the building object, prepares the building executive documentation specified in construction regulatory enactments.

The scope of Building Construction management includes the management of all construction works in the first group of buildings and the second group of buildings, including the management of engineering networks necessary for the operation of these buildings, as well as the management of fences, walls and separate well-establishment elements, provided that construction specialists are not attached to the management of individual works in other spheres. Special requirements and regulation of the profession-, the regulated profession, own-initiative practice in the field of civil engineering requires a certificate of civil engineering specialist in the relevant specialty, field of activity". The main responsibilities of the building construction manager for ensuring professional activity are: evaluation of building project documentation, organization and planning of building construction works, implementation of building construction works, completion of building construction works, building construction control and compliance with construction projects, safe work environment measures and basic principles of professional activity on a construction site. Conformity of the first level professional higher education study programme Civil Engineering to the profession standard of Building Construction Manager is available in *the Appendix No. 4*.

The content of the programme and study courses is in close relation with actualities in the field of construction. The development strategy of the construction sector points to the lack of highly qualified specialists and managers in the sector. In 2020, the LLU research project no. 8.2.3.0/18/A/009 (SIA "Dynamic University") on labor demand trends was carried out. **In the field of construction, industry experts have pointed to a marked shortage of labour**, including - lack of specialists with higher education. Demand for the longer term in the construction sector is difficult to predict. However, according to experts, the most plausible scenario is an increase in

labour demand with the possibility of cyclical fluctuations, which is typical for the construction industry as a whole, given its sensitivity to changes in the general economic situation. The labour market in the construction sector is strongly influenced by the overall economic development, the EU funds planning priorities and large infrastructure objects (for example, Rail Baltica), which account for a significant share of public procurement in construction.

The results of **the survey of employers** in the sector “Construction” also indicate a possible increase in the demand for labor: 33% of employers indicated that the demand for highly qualified specialists will increase significantly, 20% indicated a small increase, but 40% indicated a constant demand for labour. 60% of the surveyed employers in the civil engineering sector indicate that the demand for medium-skilled specialists will increase significantly, but 20% express the opinion that the demand for labour in the segment of medium-skilled specialists will increase slightly. 6.7% of respondents have indicated that by 2030 there will be a significant decrease in the demand for labour for both highly and medium-skilled specialists.

To meet the demand of the sector for the number of specialists and increase in the quality of professional qualification, it is required to improve civil engineering education and the professional qualification system. In the nearest 10 years, the engineering knowledge of the civil engineering sector will have to integrate with new competences: **ICT technologies, smart technologies, energy efficiency, passive buildings**. The main topicality for the coming years is integration of the sector with information and communication technologies (ICT), BIM (Building Information Model) platforms – research, designing, construction, supervision and management in a unified digital communication platform), which will improve the quality of projects and will make the construction organisation, transition of the building information system (BIS) to mandatory digital circulation of documents in the civil engineering sector, as well as introduction of other innovations. The topicality of introduction of BIM is also marked by more than 20 different Latvian institutions (professional organizations, ministries, academic and scientific institutions, etc.), including LLU, signing BIM roadmap in the autumn of 2019, which provides for measures for integration of BIM into the study process and practical implementation of projects. Introduction of BIM in LLU Architecture and Civil Engineering study direction requires significant resources. Therefore, over the course of the last years, through attracting funds of the European Union, the Faculty of Environment and Civil Engineering has set up high performance computer classes and acquired the software necessary for BIM in order to introduce BIM into the study content. To improve the professional skills and knowledge in BIM area, the responsible teaching staff in the programme have completed traineeship at companies that are using BIM, and have participated in training courses in Latvia and abroad.

The content of the programme is also in line with current international strategies, such as **the European Green Deal**, which, in turn, is linked to **Latvia's Sustainable Development Strategy** and several **initiatives based on the introduction of the circular economy in Latvia** (for example, The Bioeconomy Strategy). These are topics related to sustainable building, including the use of various local biomaterials in civil engineering. Also of constant relevance is the safety of buildings, energy efficiency of buildings and other aspects ensuring the quality of living environment, which are aimed at the prevention of danger to the health and life of every person.

Institutions offering civil engineering education have to improve their structural analysis and new technology programmes and simultaneously introduce the new social and digital competences. The emphasis should not be on the number of specialists, but on the quality of specialists' knowledge and skills, especially in the fields of engineering. Substantial investment is needed in future teachers and traineeship placements. A stronger young people's interest in the construction sector needs to be achieved. Young architects and civil engineers need to see that the industry is constantly evolving, there is a safe and motivating environment. In order to develop the sector, it is

important to achieve a high level of labor protection and adequate social guarantees for employees. In the future, it is important to attract the most capable young people to the industry, so it is necessary to create an educational science center for the development of the initial interest in the country, where children can learn interesting facts about the industry and the production of construction materials, the history of the construction industry in Latvia, and acquire the first construction skills.

The content of the study courses of the first level professional higher education study programme Civil Engineering is regularly updated, in accordance with the needs of the civil engineering industry and the labor market, as well as the latest scientific innovations, technologies and development trends. For example, introduction of BIM, digitization of the field, therefore study course programmes are regularly reviewed and updated. As all lecturers are active in the construction industry both in public and professional organizations, they attend both scientific and professional seminars and conferences, they are regularly informed about the development trends in the construction industry, labour market and science. Thus, the members of teaching staff annually update the content and sources of bibliography of the study courses in accordance with the latest trends, they add new information and update learning material. This is especially important in the context of the Covid 19 pandemic, when this issue was given increased attention by posting up-to-date information in e-studies.

According to the results to be achieved in the study programme, a **mapping of study courses** has been developed in the first level professional higher education study programme Civil Engineering, where the required knowledge, skills and competencies are indicated for each study course, as well as the extent to which study courses must be acquired (*Appendix No.5*).

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 Faculty of Environment and Civil Engineering of the Latvia University of Life Sciences and Technologies has accumulated many years of experience in implementing study programmes of various levels in the field of civil engineering. With the development of the economy, the demand for specialists working in the field of construction has increased. The demand for construction contractors and direct managers is especially noticeable, because the qualification of an engineer can be used more effectively in project management, planning and organization, as well as in design. The content of the program is designed to comply with the Construction Law that a person who: has obtained a first level professional higher education in civil engineering or related engineering study programme may acquire the right to independent practice in a regulated profession and specialties (construction management and construction supervision); has acquired the knowledge and skills necessary for independent practice; has received a construction practice certificate in accordance with the procedures specified in regulatory enactments.

Thus, **the aim of the first level professional higher education study programme “Civil Engineering”**: to ensure the acquisition of fundamental and theoretical foundations of the construction industry and to prepare comprehensively educated civil engineering specialists,

promoting their development into mentally and physically developed, free, responsible and creative personalities, to promote competitiveness in changing socio-economic conditions and who: would be able to organize and manage construction-related work; may continue further training in order to obtain second-level professional higher education and to obtain a certificate for attesting professional activity; as well as to provide working construction specialists with long-term practice and/or construction management certificate with the theoretical knowledge provided for in the programme and to strengthen self-education skills.

The aim of the programme is also in line with the regulations of the Cabinet of Ministers of the Republic of Latvia No. 141. of 20 March 2001 "*Regulations on the Acquisition of the State First Level Professional Higher Education*", which includes the following strategic principles:

- to prepare the learner for work in a certain profession (e.g. construction management), promoting his/her development, into a mentally and physically developed, free, responsible and creative personality;
- to promote the acquisition of knowledge and skills (including independent learning skills) that ensure the acquisition of the fourth level professional qualification of the first level professional higher education study programme "Civil Engineering" and promote competitiveness in changing socio-economic conditions;
- to create motivation for further education and to provide an opportunity to prepare for obtaining the second level professional higher education and the fifth level professional qualification.

The study plan (*Appendix No.6*) and **content of study courses** (*Appendix No.7*) of the programme, in accordance with the results to be achieved in the programme, are designed to provide:

Knowledge:

Be able to demonstrate basic knowledge and understanding of the relevant facts, theories, legal relationships and technologies of the sub-sectors of the civil and transport engineering industry or of the professional field of building construction managers, including when dealing with different areas (at the level of perception, understanding and application).

Skills:

Apply knowledge - is able, based on an analytical approach, to independently perform practical tasks in the profession of building construction manager, to show skills that allow to find creative solutions to professional problems.

Communication: to show skills that allow to find creative solutions to professional problems, to discuss and argue practical issues and solutions in the profession of building construction manager with colleagues, clients and management, to learn further with an appropriate degree of independence, improving their competencies.

General skills: is able to evaluate and improve one's own and other people's activities, work in cooperation with others, plan and organize work to perform specific tasks in the profession of building construction manager, perform or supervise such work activities that may involve unpredictable changes.

Competences (analysis, synthesis and evaluation):

Able to formulate, describe and analyze practical problems in the profession of building construction manager.

Select the required information and use it to solve clearly defined problems. Integrate knowledge of

different fields, contribute to the creation of new knowledge, development of research or building construction manager's professional methods.

Participate in the development of construction, show the understanding of the role of a building construction manager in a wider social context. Demonstrate an understanding and ethical responsibility for the scientific impact or the potential impact of the professional activities of a building construction manager on society.

Part-time study **course programmes are designed so that each of the following complements and continues the next**. Schematic structure of the content of the programme and interconnection of study courses is shown in the *Appendix No.8*. At the same time, significant work has been done to improve the programme by cooperating with Latvian higher education institutions (RCK, ViA, RTA), which also implement the first level professional higher education study programme in civil engineering, and coordinating the courses in the study programme in order to ensure the possibility for graduates of these higher education institutions to enroll in the later stages of the professional bachelor's study programme Civil Engineering at the LLU and to obtain the qualification of a building civil engineer in less years.

The information contained in study courses is logically related to the results to be achieved, the objectives pursued, etc. The goals of the study courses are related to the goals of the study programme and the results to be achieved. Sequential acquisition of study courses ensures the implementation of the study programme's goals. (*Appendix No.5 Study course mapping*)

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 aim of the first-level professional higher education programme Civil Engineering is to prepare specialists in the construction industry, ensuring the acquisition of knowledge, skills and competencies, preparing comprehensively educated building construction managers who would be able to perform complex contractor work, as well as organize and manage construction-related work in compliance with requirements of regulatory enactments; be motivated for further education. The aim of the program is also to create an opportunity for working construction specialists with long-term practice and/or construction management certificate to obtain a fourth level professional qualification.

In order to achieve the set goal, the study courses emphasize **independent work and project-oriented studies**. The methods of the study programme **implementation** are also based on the gradual and project-oriented acquisition of knowledge, skills and competencies, which are realized through the following principles:

- The study courses are designed according to **the thematic principle**, as well as so that each **subsequent course complements and continues the previous ones** (*Appendix No.8*). The study plan includes several study courses with the development of course projects. The defense of the course projects is planned in the presence of lecturers, course

members and other interested parties, which promotes the strengthening of the acquired material, and the work is then presented for a longer examination. Several study courses include study traineeships - excursions to building materials factories and construction sites. It is designed to deepen students' knowledge. In recent years, new study approaches have been integrated into the study process of the first level professional higher education study programme "Civil Engineering" - gradually moving from the already prepared solutions and knowledge transfer and demand to the discussion format, including situation analysis, productive tasks, enabling students to create new knowledge, testing theoretical knowledge in practice. The study process moves from a one-sided frontal process to student involvement and cooperation. The study process is transformed from memorizing factual knowledge to the use of knowledge and the creation of new one in a variety of situations and contexts.

- **Organization of study courses.** The organization of the study process is based on the centralized planning of lectures, laboratories and practical work. In part-time studies, sessions are organized in the form of sessions, which take place twice a year for three weeks. During the sessions there are lectures, laboratories and practical works or seminars. During the intersessional periods, the students independently perform the assigned tasks, the acceptance and assessment of which takes place in accordance with the instructions of the lecturer - either before the next session or during the next session. Faculty members are available for consultations both during sessions and between sessions in the e-learning environment, e-mails or face-to-face consultations (Covid-19 restriction period - remotely, using LLU e-learning online tools). During the session, lectures are combined with practical or laboratory work, as well as study and course work, which allows to strengthen the acquired theoretical knowledge in practice. In the spring of 2020, due to the Covid-19 pandemic, it was necessary to make significant improvements in the organization of the study process and resources to improve and ensure the availability of study materials. It was necessary to review the study materials, especially the practical works, so that they could be implemented remotely or individually. New learning approaches were implemented using the possibilities of LLU Moodle e-learning environment. Therefore, currently the study course materials are available in the e-learning environment, they have been improved and the lists of information sources have been updated in accordance with the requirements of the Construction Law and related regulations of the Cabinet of Ministers, modern trends and available literature in the LLU Library and VBF Information Center. For the qualitative implementation of distance studies, the methodological instructions for the acquisition of lectures and practical classes, for the remote completion of final examinations and exams have been revised and improved, which significantly reduces the student's chances of taking examinations unfairly.
- Students consolidate the acquired knowledge during their studies within the framework of traineeship. When going on professional pre-diploma **traineeship**, the Rector's order is prepared and issued, students are given an traineeship assignment and a tripartite traineeship agreement is prepared (LLU - Traineeship company - student). After the traineeship, the student submits an traineeship report by the deadline set by the lecturer and defends the traineeship within the specified time. Traineeship reports are accepted by at least two lecturers.
- In order to provide practical bases for the theoretical knowledge of the students, the study process includes **guest lectures from specialists working in various companies**. Each study year, students listen to about 10 guest lecturers on topics related to the study plan and theoretical study courses. For example, sustainable building, BIM, building materials, technological processes in dairy farms and their constructive solutions, production technology and application of reinforced concrete, steel structures, energy efficiency of buildings, etc.

- To learn the study courses, lecturers and students use LLU **Moodle e-studies** (*especially relevant during the Covid-19 pandemic*), which helps to publish materials and video lectures for students, to conduct online lectures and seminars, students are able to submit their work, and lecturers - to publish the evaluation, as well as to provide feedback and individually communicate with each student. For the evaluation of the acquired knowledge, as well as for self-examination, various tests are published in e-studies, the questions of which are regularly supplemented. The Moodle e-learning tool Attendance is used to control the attendance of lectures. Other digital tools are also used in some study courses, for example, separate tests in chemistry have been developed in the Kahoot application.
- **To facilitate communication**, each student and lecturer has an LLU e-mail, it is also possible to communicate in the e-learning environment.
- **The study environment is** organized to ensure maximum consolidation of theoretical knowledge in practice. High-performance computer classes for learning BIM software have been created, study and scientific laboratories have been developed, and free access to library resources has been ensured, including outside the premises of the LLU.
- **Students provide their assessment** of the content of the study course and the lecturer's work at the end of each semester, which helps to improve the content of the study course and teaching methods.

The **principles of student-centered education** in the study programme are implemented as follows:

- Taking into account and respecting the diversity of student contingents and their needs in developing appropriate learning approaches, studies often use an individual approach, which can be ensured by working in small work groups or advising students individually. It is **offered to acquire separate study courses also through the LLU Lifelong Learning Center**. Study methods are also adapted in situations where face-to-face training is not possible (for example, in the case of Covid-19).
- Respecting the needs of students, the study environment accessible to each student is ensured, **the accessibility of the environment in the premises** is also ensured. Respecting the opportunities for students to attend studies and use study and scientific equipment, as well as study infrastructure - access is also provided outside working hours. VBF provides support mechanisms and services for students with special needs and students from various social groups, the library and its resources are easily accessible to students, there is also an information center at the Faculty of Environment and Civil Engineering.
- **Lecturers are available for students** for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail. Students' independent work is planned and structured, as well as students are provided with both mandatory and additional consultations, providing lecturer's support. Consultation times of each lecturer are available in the LLU information system.
- In order to structure the students' learning process and facilitate students' sequential and regular acquisition of the subject, **study course schedules have been prepared in each study course with the topic of each week**, the work to be performed and evaluated, and the conditions for the completion.
- Promotes the student's independence, at the same time providing guidance and support by lecturers.
- **The review of student complaints** is regulated by the LLU Study Regulations (<https://www.llu.lv/en/study-guide-documents>), however, complaints are also reviewed by the commission. In addition, students are invited to escalate their problems sequentially - to the director of the study programme, head of the department, vice-dean, dean and vice-rector for studies;

- Ensuring mutual respect and participation of students and lecturers, the LLU Code of Ethics has been developed (https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf)
- **Students participate in surveys**, discussions and evaluate the study process. In order to ensure the participation of students in the improvement of the study process, the director of the study programme regularly listens to the students' suggestions and explains possible solutions for improving the studies.
- Students studying civil engineering participate in the improvement of the study process through the Student Self-Government, which delegates its representatives to the Council and the Scholarship Council of the Faculty, LLU Council and Senate.
- Student **evaluation criteria** are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria for each study work, at the start of the study course. The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works. The final works are evaluated by a commission of several members, which helps to avoid subjective evaluation.

LLU has developed Study Regulations, which envisages the **assessment** of students' work using qualitative and quantitative evaluation methods:

- The forms of control of independent work are - control of laboratory and practical work, examination of understanding of issues in seminars and tests, development and defense of term papers and projects, test or exam at the end of the study course, defense of study traineeship.
- **For the qualitative evaluation**, 10-point scale is used (*points from 1 to 10, successful evaluation starting with 4 points*) or the pass / fail evaluation (https://www.llu.lv/sites/default/files/2020-06/16_Study_Regulation_0.pdf). All final theses, projects and individual practical works are evaluated with a mark. Laboratory work, which is mainly performed in person, is often assessed by pass/fail. If part of the work in the study course is intended to be performed as group work, there is always also an individual work which is assessed with a mark and which has a greater decisive role in the final assessment.
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS). In total, the study program is mastered if the study courses in the amount of 120 CPs (180 ECTS) have been successfully completed.

In addition, the **attendance** of the study course is controlled throughout the course, as well as the developed test papers and / or exam paper / course project are submitted within the specified time.

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.

An obligatory component of the first level professional higher education study programme Civil Engineering is **professional pre-diploma traineeship outside the educational institution**, in

accordance with the Cabinet of Ministers of the Republic of Latvia Regulations No. 141 "Regulations on the first level professional higher education state standard" (20.03.2001) and LLU Traineeship Regulations (12.11.2014) (*Appendix No. 9*). The first level professional study programme Civil Engineering professional pre-diploma traineeship *Building Management I and II* is planned for part-time students - in the 6th semester (3rd year) - 20 CP (corresponding duration - 20 weeks).

The **general goals of the traineeship** are: to ensure the combination of students' theoretical knowledge with practical work in order to assess the possibility to apply the knowledge acquired at the university in practice; to acquaint students with the real situation in construction companies and employers with the potential workforce; to enable entrepreneurs to involve students in the performance of daily work duties, thus assessing the potential of their work abilities; to promote co-operation between construction companies and an educational institution in order to be able to better understand the wishes and needs of entrepreneurs regarding new specialists; to get acquainted with the construction organization, its organizational scheme, the volume of the work performed, the place of the construction organization in the Latvian construction market; to acquire the necessary skills in construction management; to strengthen, expand and systematize theoretical and practical knowledge; to acquire skills in organizing civil engineering work on construction sites; to acquire the materials required for the development of the qualification work in line with the individual tasks - both for the individual task issued by the professional traineeship supervisor of the construction organization and for the individual task issued by the qualification work supervisor. In order to better achieve the set goals, students are involved in the daily work of the company, entrusting them to perform various independent duties and tasks related to the practical aspects of work, involving them in paid work.

Students of the first level professional higher education study programme Civil Engineering, in accordance with the requirements of the study programme, in the 3rd year during the professional pre-diploma traineeship develop an traineeship report / overview and, at the end of the traineeship period, defend it. The aim of developing a professional pre-diploma traineeship report is to acquire skills and abilities in the systematization and practical application of theoretical knowledge. The report of the professional pre-diploma traineeship is developed during the traineeship period and submitted in writing in accordance with its content, design and other requirements.

The traineeship report is a reflection of individual, practical and cognitive work. According to the study course programme, in the development of the above mentioned reports, the students are able to: select and compile statistical data and various other reports; to analyze and evaluate various indicators important for companies; to compile, analyze and evaluate the economic activity and development indicators of enterprises (organizations, institutions); to show the ability to use the information technologies and theoretical knowledge available for this purpose in the relevant subjects; draw conclusions and make proposals.

The works meet the following requirements: reflect the knowledge of specialized civil engineering literature, economic information and other sources; reflects the ability to collect and analyze information using appropriate research methods and technical means; contains specific, topical problems for independent or group research; contains an accurate, clear and logical presentation of the course and results of the research, the author's conclusions and proposals arising from the research results; demonstrates the ability to use civil engineering, marketing, accounting, logistics, personnel management and other methods and information technologies, as well as foreign experience in solving specific issues; demonstrates the ability to work creatively, conducting research and developing activity programs.

After the professional pre-diploma traineeship the student has: strengthened, expanded and systematized theoretical and practical knowledge and critical understanding of civil

engineering work processes, technology, civil engineering work planning, organization and management on the construction site, acquired the necessary skills in construction management and organization on the construction site, acquired skills in construction work organization on construction sites, has the necessary competence cooperation to prepare a qualification work under the guidance of the qualification work supervisor, to collect the materials necessary for the development of the qualification work in accordance with the individual task, as well as to develop the individual task issued by the manager of the civil engineering organization.

Professional traineeship is one of the purposefully and sequentially implemented work environment-based study activities of LLU VBF. LLU supports students to achieve the tasks set within the traineeship by offering traineeship places in the largest cooperation partner companies, as well as allowing students to choose traineeship places themselves, in accordance with the professional activity and traineeship programme. In co-operation with the construction industry and local governments, several activities were implemented in the provision of pre-diploma traineeship places.

Taking into account that the majority of students in the programme are already working in the field, students also have the **opportunity to equate their pre-diploma traineeships by proving their professional activity** - by submitting the relevant certificates to the LLU Lifelong Learning Center (<https://www.mc.llu.lv/pakalpojumi/pieredzes-atzisana> (only in Latvian)).

For the first level professional higher education study programme Civil Engineering, support for professional traineeships in a manufacturing company related to the specialty is very important. Professional pre-diploma traineeships have been provided by leading construction companies in Latvia and abroad: SIA "Vinder ER", SIA "VIA-S modular houses", IU Arhitekts Viktors Bērziņš, SIA "SCCELLANET", SIA "Selva Būve", SIA "ARTCORE", SIA "MK dizains", SIA "Kokile", SIA "ARBEKA", SIA "M un N", SIA "Pēkaiņi", SIA "NORTHPROJECT", SIA "Būvkore", "KVINTETS M", SIA "More Energoremonts Rīga", SIA "Ventspils nekustamie īpašumi" pašvaldības, SIA "Skonto Plan LTD", SIA "SCO Centrs", SIA "ERBO", SIA "JOE", SIA "Metalux", SIA "Bukoteks", SIA "YIT Latvija", SIA "ENERGOREMONTS RĪGA", SIA "ULRE", SIA "SCCELLANET", SIA "ERI AUTO", SIA "EMPOWER", SIA "Tilts", SIA "MODHUS", Menard Polska Sp.z.oo. (Poland), PLENAB AB (Sweden), etc.

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' qualification works are topical in the construction industry and indicate the development trends of the industry, because all the topics are real, related to certain customers and are developed as a project variant (Table 2). In the qualification works, they work on the second group of buildings of different nature (according to the Cabinet of Ministers of Latvia Regulations No. 500 "General Building Regulations"), for which simpler calculations of building structures are performed, technological maps of construction, a general plan for construction and economic calculations are made. Students choose to design both industrial and public buildings, as well as residential and agricultural buildings, indicating the place where the building is to be built. The qualification work task also includes the special tasks to be solved (related to research and relations with the Qualification work).

Most of the qualification work Evaluation Commission are representatives of the construction industry, who appreciate the quality of the developed work and the professionalism of the

graduates, and whose opinion is taken into account when choosing the topics for next year. The average evaluation of each year's qualification works indicates the quality of graduates and work ethic. Most of the graduates of the program are already professionals in the field during their studies, therefore the quality of work development and defense is mostly very good.

Table 2

Topic of the qualification works

Study year	Total number	Industrial buildings	Public buildings	Residential buildings	Agricultural buildings	Average mark
2014/2015	-	-	-	-	-	-
2015/2016	-	-	-	-	-	-
2016/2017	6	1	4	1	-	9,33
2017/2018	18	4	10	2	2	8,27
2018/2019	10	1	6	3	-	8,24
2019/2020	10	2	8	-	-	8,00

Each year, the best qualification works are marked in the reports of the Examination Commission. Upon receipt of the Diploma, **the honorary diplomas from the Latvia Association of Civil Engineers (LBS) are also awarded to the best graduates**, thus stimulating higher achievements. The best works are also published in the LBS magazine "Būvinženieris" and are awarded in competitions of industry professionals.

In recent years, the topics of the qualification papers developed and defended by students have been the following: Production building and wood waste storage in Aloja region, Reconstruction of Marupe State Gymnasium stadium, Office building in Riga, Warehouse building in Babite, Sports center in Jelgava, Hotel - hostel "Geleos", Multifunctional new building in Jurmala, Hotel new building in Jurmala, Multifunctional halls new building in Rezekne, Training Corps for Crafts and General Education secondary school in Dobeles, etc.

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 of the programme are able to participate in the improvement of the study process through the VBF Student Self-Government, which delegates its representatives to the VBF Council, the Scholarship Commission, and the LLU Convention. Students also regularly participate in surveys, discussions and evaluate the study process.

Student surveys are related to the quality of teaching staff and study courses. Such surveys are conducted twice a year at the end of the semester. Evaluating the results of the survey and drawing conclusions, work continues on improving and perfecting the methods of teaching study

courses. In the last year, the improvement work is especially related to distance learning in the e-environment.

The summary of the student survey "Evaluation of Civil engineering Study Programmes" conducted during the pandemic shows a positive evaluation. The aim of the survey was to find out the students' opinion about the study programme to be acquired. The obtained information was used to make improvements and additions in the further organization and improvement of the study programme.

In general, to the question "Are you satisfied with your choice of university and study programme?" students answered in the affirmative (with choice of university – 62% fully satisfied, 38% - more satisfied than not satisfied; with choice of the programme – 50% fully satisfied, 50% - more satisfied than not satisfied).

The question "What prompted you to choose this university and study programme?" has been answered:

- I wanted to combine studies with work;
- Location;
- Choosing a university because I don't like Riga and I chose the study programme because I graduated from college in that sort of education.
- I work in the construction industry near home;
- The study programme corresponded to my chosen future plans. As far as it is possible to study part-time only for a fee and I pay for the studies from my own funds, then I chose LLU, because the tuition fee was significantly lower than at RTU;
- Higher education in civil engineering is necessary in everyday work.
- Availability of remote study.

Most students combine studies with work, so they made suggestions for improving the lesson plan in the sessions. In general, the respondents were satisfied with the quality and course of studies, however, they also made suggestions for the improvement of the study process.

It should be noted that the student survey took place at a time when we have been working in an emergency situation for more than a year due to the COVID 19 pandemic and are looking forward to providing face-to-face classes that are very important for both students and faculty. Therefore, the positive feedback on the study process in these conditions is to be welcomed, which indicates the ability of the teaching staff involved in the programme to adapt and use new study methods based on distance learning in the study process.

Graduate surveys have also been conducted. The results of the graduate survey show that 82% of respondents work in the industry and 18% are engaged in entrepreneurship. From the answers it can be concluded that the majority of graduates work in the chosen specialty after graduation.

The next issue was related to the *main responsibilities in the current job*. It can be concluded from the answers that 55% of the survey participants work in the field of control and supervision, which is also related to the acquired qualification of building construction manager; 18% work in production, the same number of graduates do administrative work, but 9% work in the field of estimation. In order to reflect the wide range of activities in the field of rural building, graduates of the study programme are attracted as guest lecturers in seminars and separate guest lectures to share their experiences with current students on topics that are currently relevant and on which the graduates of the programme work.

The graduate surveys also include questions related to the application of the knowledge, skills and competencies acquired in the study programme in the current job. To the question "How do you

assess your level of preparation for a working career at the end of the programme?" the respondents provided the following answers: 18% - very high, 37% - high, 18% - medium. All respondents work and improve their qualifications in Latvia, some work abroad. In general, graduates are satisfied with their education. It opens the possibility to obtain a construction manager and / or construction supervisor certificate and to work as a responsible construction manager or construction supervisor.

ESF project "Improvement of Latvia University of Life Sciences and Technologies governance" No. 8.2.3.0/18/A/009 "**Study on labor demand trends for the period up to 2030**" project No. 8.2.3./18/A/009 ("Dynamic University, 2019). The study reflects trends in the construction industry, which indicates the need for new industry specialists in the coming years. According to the results of the research, the civil engineering study programmes were also reviewed and improved in order to more precisely correspond to the needs and demand of the industry.

In the focus group discussion with the industry, the ability to specialize (for example, design, buildings, heat, water, gas, construction management, etc.) as well as to maintain a broader view of the industry as a whole was mentioned as **an important competence**. As is mentioned, the need to manage **BIM**, the ability to link theoretical knowledge to construction practices (the mentioned competence refers to the first level professional higher education study programme "Civil Engineering", traineeship in the study program - 20 CP).

Employer surveys show an increase in the labor market demand for highly educated specialists. The specialist must be competent in an industry-appropriate education, have good engineering knowledge, especially in design, and have good managerial skills. Must be competent in communication and teamwork, be honest, responsible and accurate. The specialist must have mastered BIM technology and 3D modeling programs, have the ability to combine theoretical knowledge with practice, have a quality-oriented attitude.

Based on the results of the survey, changes were made in the LLU professional first level professional higher education study programme Civil Engineering, integrating BIM training in design study courses, as well as combining study plans of first and professional bachelor study programmes Civil Engineering to provide opportunity for graduates of the Programme to resume studies in later stages and obtain qualification of Building Civil Engineer in shorter period of studies. Computer classes are being developed, high-performance computers with BIM-supporting software have been purchased. Excursions and virtual meetings are also actively organized, especially during the COVID 19 pandemic.

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.

As the first level professional higher education study programme Civil Engineering is **implemented only in part-time studies**, all students work in the specialty and combine studies with work. Consequently, there is **no pronounced student mobility in this study programme**. Also, students in the programme often work in Latvia's leading civil engineering companies, such as AS "UPB", "Skonto Plan", etc., whose representative offices are also abroad. Thus, within the framework of their direct work, students implement civil engineering projects in other countries - England, Norway, Sweden. Often, practical work abroad is equated with the professional pre-diploma traineeship included in the programme plan, performed in co-operation with the LLU

Lifelong Learning Center (<https://www.mc.llu.lv/pakalpojumi/pieredzes-atzisana> (only in Latvian)).

Students in the programme have the opportunity to participate in various study activities abroad. For example, in cooperation with **The University of Trás-os-Montes e Alto Douro (UTAD) in Portugal** and **Wrocław University of Environmental and Life Sciences in Poland**, the International Summer School of Building Engineering Students was organized (2019 in Latvia; 2018 in Portugal; in 2017 in Poland).

LLU also specializes in the organization of **EPW (European Project Week)** organization with the Engineering College of Copenhagen in Denmark, Edinburgh Napier University in Scotland, Lyon Technical University (IUT A Université Claude Bernard, Lyon) in France, Amsterdam University of Applied Sciences in the Netherlands, University of Burgos in Spain. During the EPW, students from 5 universities (about 100 students) solve the problems of civil engineering of large world-class objects in separate working groups, analyze, collect data and present the obtained results on the closing day. This type of cooperation has been going on for many years. EPW activities, in which LLU civil engineering students and lecturers also participated, have taken place in Edinburgh (Scotland), Lyon (France), Jelgava (Latvia), Amsterdam (Netherlands), Copenhagen (Denmark).

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 resources of the study program consist of three groups - equipment, software and literature. Industry publications for studies and research work are available in the Subscription of the **Fundamental Library of the LLU**, Subscription of Study Literature, in the Reading Room, in the deposit library of the Food and Agriculture Organization of the United Nations. Reference literature and bibliographic references on various issues related to civil engineering and other fields are available at the Bibliographic Information Department. To search for information sources that are not available in the library collection, students can use the subscribed databases in the LLU network or outside the LLU network by using the personal accounts in the LLU information system (LLU IS). Information can be obtained at the Reference and Information Center of the Fundamental Library of the LLU, as well as interlibrary loan services can be used. The search engine LLU Primo Discovery, online databases BIS Aleph500, online databases created in the Fundamental Library of LLU (8 databases of different levels) are available for searching of scientific literature. When using the LLU IS user account, a number of subscribed databases are available: CAB Abstracts; CRC Press e-books; EBSCO databases; EBSCO eBook Academic Collection; ScienceDirect journals; Scopus; Web of Science and others. Faculty and students are informed about databases to which access is granted on a temporary basis. Databases of lecturers' publications and doctoral theses have also been created. The staff of the library provides consultations on current events, as well as advises

students on searching for scientific information. The informative and methodological base of the LLU is detailed, transparent, and structured so that students can quickly obtain all the information related to their studies, get acquainted with the study course materials and study course requirements in the LLU e-learning environment, and the LLU Fundamental Library provides students with very a wide range of study and scientific literature and access to a variety of databases. The LLU Fundamental Library regularly supplements the range of various publications available to support students with sources for the acquisition of the civil engineering study programmes, as well as for research. The appendix contains books and study materials that have included in the range of materials used in the study direction during the reporting period.

Students may use **the Faculty of Environment and Civil Engineering Information Centre** that provides free access to the LLU Fundamental Library databases and specific industry literature - books, standards, scientific and industry journals; it is also possible to print large format works, such as study projects <http://www.vbf.llu.lv/lv/informacijas-centrs> (in Latvian).

During the reporting period, **the study and science infrastructure in the field of civil engineering was significantly improved** by attracting funding from the earnings of the Faculty of Environment and Civil Engineering (tuition fees, etc.), ERDF projects “Strengthening research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions” (No. 1.1.1.4./17/I/003) and “Modernization of STEM study programmes” (No.8.1.1.0 / 17 / I / 001), as well as from various other projects implemented at the faculty. Significant repairs have been made to improve study classrooms and laboratories; high-performance computer equipment has been purchased that supports the development of digital skills, including BIM; as well as acquisitions of equipment, tools and furnishing have been made. All classrooms necessary for the study work are equipped with the necessary technical means for conducting classes - multimedia equipment, computer equipment, appropriate software and Internet access.

In general, several **study and scientific laboratories** are involved in the implementation of the study process of the programme:

The Training laboratory for construction materials is equipped with the equipment necessary for students to get acquainted with the composition of building materials, create test samples and perform various parameters testing of the manufactured samples. The following materials are used for laboratory work of building materials: mixers, sieve shaker, vibrating table, drying cabinet Snol E 58/350 E5CN, water bath, pressure test press P-10 and MOP-125, as well as automated control material strength parameters determination device CO89-04N, Matest .

The Building physics laboratory is equipped with temperature and humidity meters and recorders, material humidity level meters, air motion detectors, luxometers and a thermal chamber. All equipment is intended for teaching and scientific work in the field of construction physics. As part of the glass construction study course, a glass impact test stand, glass thickness and coating determiner are available

Research and training laboratories of Structural Engineering. In recent years, a pressure equipment ALPHA 10-3000 HK-4SH for testing large-scale models and a high-precision fiber-reinforced concrete testing equipment DELTA 5-300 S have been purchased and mastered. The set includes a hydraulic station PA 19-280bar-WKN, control and test control system RS-C30-N-PC with software package PROTEUS. Researchers have a variety of measuring devices at their disposal to measure and digitally record displacements. With a multi-channel strain gauge set consisting of two Quantum MX 440B and MX 1615 B data receivers, it is possible to simultaneously record data from 16 strain gauges and 4 inductive displacement sensors. The universal test device INSTRON (250 kN) has been used for many years to test various materials and building civil engineering models in compression, bending and tension. For the loading of large, relatively full-scale curved structures, a

6.0 m long floor with two movable frames and synchronizable hydraulic Zwick power cylinders and a pump station with a maximum force of 400 kN is available. All power units are regularly calibrated once a year. The scientific laboratory of building structures is equipped with a bridge crane (40 kN) and the necessary materials and tools. The researchers can use a bar locator Proceq SA with accessories as well as Schmidt's hammer and an ultrasonic device for testing the strength of materials.

The Soil mechanics training laboratory is provided with a load cell for recording the force with a cable for the shear test equipment; natural convection drying cabinet; direct and permanent soil shear test equipment.

The Laboratory of pumps and the hydraulic modeling laboratory perform laboratory work in the study courses Hydraulics, Hydraulic Structures, Pumps and Pumping Stations. The laboratory is equipped with a water flow trough that can be adapted for various laboratory and scientific research works, water flow visualization table, three-stage cascades, shaft drainage and stream models, CAM85/25 water supply machine, as well as a pump stand for pump flow, pump efficiency and various circuit type laboratory works.

Various visual aids are available in **the Water supply and sewerage laboratory**: pump 0.33 kw CTM61-5AC, Oxygen meter (DO-meter), pH meter portable AD 1402, pump BIOX 400-12 Nocchi, oximeter GOX-20, various materials, year of manufacture and types of fittings, pipes and fasteners to be demonstrated to students in supplemented lectures and practical work.

In the study programme, the work with the geographical system (GIS) data is supported by the **GIS Competence Center** established in 2018 within the framework of the Latvian-Lithuanian cross-border cooperation project "Creation of Joint GI Education to Increase Job Opportunities in the Region". The center has 12 workstations equipped with ArcGIS Pro software for studies and research work. Various remote sensing tools are also available under the supervision of the project supervisor. By attracting funding from EU funds, modern, state-of-the-art toolkits have been purchased, such as electronic tachometers, digital levelers, optical theodolites, optical levelers, digital rangefinders, global positioning equipment (single-frequency and dual-frequency), closed engineering search equipment, robotic tachymeter, ground scanner, unmanned aerial vehicle (drone), photogrammetric camera, as well as laths, stands, measuring tapes, reflectors and other materials necessary for the implementation of the surveying study courses. The GIS Competence Center houses a large-format scanner for scanning cartographic images, as well as a plotter and a 3D printer, which students may use in the process of developing scientific and diploma projects.

New measuring instruments were purchased for **the Land surveying training laboratory**, because the existing measuring equipment base of the measuring instruments was worn out and it was necessary to renew it. 7 optical theodolites Fet 500, Geo-Fennel; rotary leveler EL 515 Plus SEt, Geo-fennel; 7 optical theodolites with electronic display Stonex STT 402L; GNSS equipment set Stonex S900A; Stonex S40 with Cube-A software were purchased from the funds of the Faculty of Environment and Civil Engineering.

Computer equipment and software. At the Faculty of Environment and Civil Engineering two computer classes with 49 are available for students in the programme. (25 workstations in room 803, 24 workstations in room 702) for high-performance computers equipped with BIM support software. Several of the computer programs are available on the Academic Data Network (RTU), such as the latest versions of the Autodesk computer programs AutoCAD and Revit, which are used to design architectures and structures by modeling elements in a 3D environment. Computer programs such as Microsoft Project for designing linear schedules of civil engineering works, site management, etc. are also available for work planning, ArcMap and ArcGIS Pro mapping, Mathcad for various mathematical calculations, PHPP building energy audit and passive building design,

Trisco & Cobru 86 thermal bridges calculation, Soundplan 7.1 for environmental noise modeling, Dlubal RFEM and Axis VM for building structure calculations, IDEA StCati Steel for design of metal joint assemblies, Tekla Structures and SEMA for modeling of building structures in 3D environment. The classrooms are equipped with interactive displays and whiteboards, which provide an opportunity for teachers to explain the study material and tasks with versatile and interactive methods, but for students - to present their study works.

The classrooms are equipped with interactive displays and whiteboards, which provide an opportunity for teachers to make the explanation the study material and tasks more versatile and interactive, but for students - to present their study works.

Provision of financing

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

Taking into account that **the first level professional higher education study program Civil Engineering is a fully paid study program without state funding, a large part of the funding for the implementation of the program is covered by the received tuition fee.** In 2021, the tuition fee in the first level professional higher education study programme Civil Engineering is 700 EUR per semester, or 1400 EUR per year.

In 2020, the share of costs of the first level professional higher education study program "Civil Engineering" consisted of:

- Remuneration - 71%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

In general, it can be concluded that the study base, scientific base, information base, material and technical base and financial base comply with the specifics of the study programme, its implementation conditions, as well as student-cantered education principles and creates preconditions for achieving study results and indicates the possibility to ensure a high quality study process.

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 total number of lecturers involved in the first level professional higher education study programme Civil Engineering has changed minimally. The gradual attraction of new employees for the implementation of the study process is to be positively assessed. It is evidenced by the attraction of new lecturers in the study process, including doctoral students of the doctoral programme Civil Engineering of LLU and professionals from the industry. Changes in membership of academic staff are added in the *Table 3*. The total number of involved academic staff is 33 teaching staff members (23 - from VBF, 10 - from other faculties of LLU). As several lecturers are also research assistants and leading researchers, the total number of academic staff according to the distribution of positions is indicated in *Table 3*.

During the reporting period:

- 19 teaching staff members have been elected to academic and scientific positions as lecturers (2), assistant professors (2), associate professors (4); professors (2), research assistants (2) and leading researchers (7):
- 12 teaching staff members have been promoted.
- 9 teachers have terminated their employment both when changing to another job, while on parental leave, and when they retired or passed away.
- 8 new teachers have started new employment relationships and become teachers.

Table 3

Number of academic staff involved in the first level professional higher education study programme Civil Engineering

Position	2014/2015 study year		2020/2021 study year	
	number	%	number	%
Professors	4	10	3	10

Associated professors, incl. Emeritus	8	21	6	18
Assistant professors	8	21	4	12
Lecturers	18	46	20	60
Assistants	1	2	-	-
Total number	39	100	33	100
Incl. Leading researchers	-	-	8	24
Incl. research assistants	-	-	2	6

Some of the lecturers who teach specialization study courses, in addition to working at the university, also work in building companies. This shows that students receive up-to-date information about the processes in production and business and it improves the acquisition of theoretical knowledge. As the **study programme is professional, the connection of the teaching staff with the production improves the real choice of topics both in the course projects and in the choice of the topics of the final work.**

During the reporting period, **foreign guest lecturers**, as well as **guest lecturers from the industry** were attracted as much as possible. Involving guest lecturers in the study process is very important, because often guest lecturers introduce students and lecturers to a very specific or narrow topic, which cannot be included in the study programme plan, but which provides important additional information. It is also important to learn about foreign experience, showing what is relevant in the field at the international level. Attraction foreign and local guest lecturers is not paid from the state funding for the study program, therefore external funding sources are required. A positive experience, within the framework of the project "Improvement of LLU academic staff" (No. 8.2.2.0/18/A/014) implemented by LLU in the study year 2019/2020, a professor from the Estonian University of Life Sciences has been attracted to an employment contract at the Department of Building Structures. The Faculty of Environment and Civil Engineering attracts foreign guest lecturers every year from the faculty's own earned funds (tuition fees) in the fields represented by the faculty. Thus, in the 2017/2018 academic year, a professor from the University of Maribor in Slovenia was attracted to an employment contract. The professor gave valuable lectures and consultations to students in the field of building structures. Guest lectures are also given by foreign lecturers doing traineeships at LLU. For example, in the 2017/2018 academic year, guest lectures in civil engineering programmes were also given by a lecturer from the Wrocław University of Environmental and Life Sciences in Poland.

Every year, in cooperation with companies and graduates, guest lectures are organized for students in the programme. Specialists mainly introduce the latest technologies in production, modern wooden, steel and reinforced concrete structures, technological processes in agricultural buildings,

the provision of traineeships and jobs. During the reporting period, the average number of guest lectures in the program is 10-15.

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.

The qualification of the teaching staff involved in the programme **fully complies with the conditions of the study programme implementation and the requirements of the regulatory enactments** (Table 4). Regular professional development of the teaching staff helps to achieve the study results.

Table 4

The conformity of qualification of the teaching staff with the requirements of the regulatory enactments

Requirements of regulatory enactments	Compliance of the first level professional higher education study programme “Civil Engineering”
The qualification of the academic staff involved in the implementation of the study programme complies with the requirements of the Law on Higher Education Institutions regarding the implementation of study programmes in a university-type higher education institutions. The provision set forth in Section 39 of the Law on Higher Education Institutions - <i>“Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught.”</i>	<i>has been ensured</i>
The knowledge of the state language of the teaching staff involved in the implementation of the study programme complies with the regulations regarding the scope of knowledge of the state language and the procedure for testing the state language proficiency for the performance of professional and official duties.	<i>has been ensured</i>

<p>The provision set forth in Article 39 of the Law on Higher Education Institutions for Academic Staff of Professional Study Programmes - taking into account the need to acquire practical skills and knowledge, a person with higher education without a doctoral degree or professional doctorate in arts may hold the position of docent, lecturer and assistant if he or she has sufficient practical work experience corresponding to the subject to be taught. In order to elect a person who does not have a scientific doctor's degree or a professional doctor's degree in arts, this person needs no have at least seven years of practical work experience. The requirements to be set for applicants for such a position of docent shall be approved by the Senate or the Council, respectively, in higher education and college. Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught.</p>	<p><i>has been ensured</i></p>
<p>The provision set out in Article 40 of the Law on Higher Education Institutions on Visiting Professors, Visiting Doctors and Guest Lecturers - if a higher education institution or college has a vacant or temporarily vacant academic position, the Senate on the initiative of the faculty council, may decide not to issue a competition, but to recruit for a period of up to two years a visiting professor, associate visiting professor, visiting doctor, guest lecturer or visiting assistant.</p> <p>(2) Visiting professors, associate visiting professors, visiting associate professors, guest lecturers and visiting assistants have the same rights and obligations as professors, associate professors, assistant professors, lecturers and assistants, but they are not entitled to stand for election to the Constitutional Assembly, Senate and Academic Arbitration Court and may not be elected as members of the said institutions.</p>	<p><i>has been ensured</i></p>
<p>Each member of the academic staff has published articles in peer-reviewed publications, including international publications, in the last six years (in case of a shorter period worked, the number of publications is proportional to the time worked) or creative artistic achievements (such as exhibitions, films, theater performances and concerts), or five years of practical work (except length of service in the implementation of the study programme) in accordance with the Law on Higher Education Institutions</p>	<p>has been ensured</p>

Of the 33 teaching staff members involved in the study program, 10 are with Dr. degree, which makes up 29.4% of the total number, the rest have a master's degree, a large part of which are either currently studying for a doctorate or have temporarily stopped doctoral studies, but are continuing their research work.

Within the framework of professional development, the teaching staff participates in the

following activities

- **ERASMUS + mobility** to foreign universities and research institutions;
- **professional development courses and seminars with training**, including university didactics courses;
- **conferences and seminars as listeners**;
- **exhibitions as visitors**;
- **maintained professional certificates**;
- **traineeship in companies** ESF project no. 8.2.2.0/18/A/014 "Development of academic staff".

5.tabula

Participation of the academic staff of the programme in activities of professional development

Sudy year	professional development courses (incl. English)	Conferences, seminars	Exhibitions	Other (traineeship in companies, professional certificates)
2014/2015	9	22	4	8
2015/2016	8	13	4	8
2016/2017	9	23	6	5
2017/2018	7	15	12	9
2018/2019	13	17	13	10
2019/2020	19	7	2	8
Total number	65	97	41	53

The lecturers involved in the implementation of the study programme regularly raise their professional qualification. At least once every six years, the lecturers attend the professional development programme for higher education lecturers "**Innovations in Higher Education Didactics**" (160 h). During the reporting period, 10 lecturers completed the professional development programme for lecturers and obtained a certificate.

During the reporting period, 8 lecturers improved their qualification **in English language courses**. Teachers also improve their English language skills by going on ERASMUS + mobility to partner universities abroad and participating in international conferences, cooperating with international partners within the framework of various research projects, for example:

- Wrocław University of Environmental and Life Sciences in Poland conducting guest lectures, workshops, consultations, reviewing scientific articles
- The University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and Wrocław University of Environmental and Life Sciences in Poland, LLU Civil Engineering study programme in organizing the international scientific conference ICOSADOS and reviewing scientific articles, as well as organizing and conducting a student summer school. International Summer School

of Building Engineering Students

- For European project Week EPWorganizers - the Engineering College of Copenhagen in Denmark, Edinburgh Napier University in Scotland, Lyon Technical University (IUT A Université Claude Bernard, Lyon) in France, Amsterdam University of Applied Sciences in the Netherlands, University of Burgos in Spain.
- Aleksandras Stulginskis University in reviewing scientific articles.
- University of Maribor in guest professorship, guest lectures, organization of seminars, review of scientific articles
- etc.

During the reporting period, in addition to the opportunities for professional development offered by LLU, teachers have actively attended other institutions, such as the Zemgale Region Competence Development Center, DVS Namejs User Support Center, Latvian Association of Civil Engineers and **other organized professional development courses**. The main topics of the courses and seminars are related to the latest regulatory framework in civil engineering, innovations and technical solutions, green and sustainable building, digital skills. Within the framework of the LLU implemented project "Development of the LLU academic staff" the teaching staff had the opportunity to do **traineeships in the companies** of the branch. The teaching staff increases their qualification by participating in the **Academic Conference of the LLU**, where topics relevant to the implementation of the study process are considered.

In addition, **teaching staff are active in a variety of industry organizations, associations and networks, including international organizations** such as International Association for Bridge and Structural Engineering (IABSE); Green Economics Institute England, Oxford (GEI); Nordic Association of Agricultural Scientists (NJF); The European Intellectual Property Teachers' Network (EIPTN); International E-learning Association (IELA); German Institute for Construction Technology (Deutsches Institut für Bautechnik); Azerbaijan State Agency for Control over Construction Safety of the Ministry of Emergency Situations.

The qualification of the teaching staff complies with the conditions of the study programme implementation and the requirements of regulatory enactments. This is evidenced by the demand for them to **read guest lectures/ participate in seminars for industry specialists**. Lectures are given in companies engaged in raising the quality of certified civil engineers, for example, SIA CMB Inženieru kompetences centrs; SIA LBS konsultants; A/S UPB etc. Topics covered are related to building structure calculations, building project expert inspections; division of responsibilities in the civil engineering process; building acoustics, the most common discrepancies and frequently unresolved issues. Practical classes in Automation of calculations of reinforced concrete structures, Design of composite building structures in accordance with Eurocode 4, Estimation and construction of wooden structures in accordance with Eurocode 5, Estimation and construction of wooden building structures I: Beams and panels of wood materials, Estimation and construction of wooden constructions II: Design of wooden floor trusses, Estimation and construction of wooden constructions III: Wooden frames, columns, arches.

The professional qualification of the academic staff and its improvement help to achieve the learning outcomes, especially in the professional study programmes, because students are provided with professional knowledge; study trips to construction sites can be better implemented if the teaching staff members are involved and active in the industry, attend seminars, follow the current events of the construction industry, manage traineeships, they assist in providing traineeship places. Students highly value the advice of professionals, especially in developing course projects and qualification papers under the guidance of professionals. Teaching staff members often help students with job recommendations after graduation.

The teaching staff is highly valued and has received various levels of awards at the level of state and professional institutions. The Ministry of Agriculture Award “For Diligence”; The Honorary Mention of the Ministry of Agriculture; 4 teachers have received the Grand Prize of the Construction Industry for Lifetime Achievement. There are awards Civil engineer of the Year, the Mentor of the Year.

The qualification of the teaching staff fully complies with the conditions of the study programme implementation and the requirements of the regulatory enactments. Regular professional development of the teaching staff helps to achieve the study results.

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.

According to the Senate Decision No. 10 – 70 of 11.03.2020 the academic work of LLU includes not only the pedagogical work, but also research and work on ensuring quality of the study process. **Each year the academic staff, leading researchers, researchers and scientific assistants provide information on their scientific activities and receive an assessment according to the effective criteria set by LLU Science Council.**

Research activities of the academic staff of the programme are in close relation with the priority research directions in the area of civil engineering set out in the LLU Development Strategy 2015 - 2022 (<https://www.llu.lv/index.php/en/mission-and-vision>): *Sustainable construction, development of new, innovative building materials and studies of their properties; Safety of building structures and their operation under sustained loading.*

In accordance with these research directions, the academic staff of the study programme

implement the following activities, also involving students of the programme:

- European Union funded research projects;
- Contract research with construction companies;
- LLU internal research projects;
- Research projects.

Undergraduate, master's and doctoral students of civil engineering study programmes are often involved in the implementation of projects to use obtained results from the projects in their research work in study programme.

Safety of building structures and their operation under sustained loading.

The academic staff of the Department of Structural Engineering of VBF, doctoral students, master students, as well as in some researches also undergraduate students are involved in the implementation of their research. Experimental and theoretical research has been carried out, the results of which have been useful for civil engineering companies, and are reflected in reports at conferences, publications and master's theses, as well as in future doctoral theses.

The research work of the academic staff in the projects has facilitated not only the acquisition of **new knowledge and its inclusion in the content of the study program**, but also **the development of laboratories**, attracting funding for the purchase of new equipment and facilities. For example, ERDF project "*Efficiency of fibre reinforced cement composites in structural walls*" (No.1.1.1.2/VIAA/3/19/487) of the programme "Growth and employment" 1.1.1 support objective "To increase the research and innovative capacity of Latvian scientific institutions and their capability to attract external funding, investing in human resources and infrastructure". Already before the particular project there have been significant research activities implemented during the research contracts with companies from the industry. For example, research contract "*Loading tests of concrete manholes and inspection chambers in accordance with the standard LVS EN 1917*" (SIA Guno M, SIA PRIORITET, AS SMILTENIEKI etc.), experimental studies on *the mechanical strength of concrete construction products* (SIA Inspecta Latvija), experimental studies on *shear capacity of bolted joints* (SIA CMB, SIA "Empower", SIA UPPE), research contract "*Fibre reinforced concrete prisms: production and measuring the flexural tensile strength in accordance with the standard LVS EN 14651*" (SIA PICHE), experimental studies on *load bearing capacity of precast concrete slab-wall connection* (SIA UPB) etc. Within the mentioned above project the scientific article "Load Bearing Capacity of Precast Concrete Slab-Wall Connection" was developed (indexed in Scopus data base). After the completion of the project a new research contract was concluded with the company AS UPB (Nr. 3.2.2.-9/28), resulting in attraction of new doctoral student for studies in the PhD study programme Civil Engineering at LLU in 2021. Within the framework of his doctoral thesis student is working on the topic of precast concrete slab-wall connections. The doctoral student is also a lecturer of the program. Within the cooperation between the companies from the industry, as well as by attracting ES funds within the project "*Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision.*" (Nr. 1.1.1.4./17/I/003) implemented by LLU, **significantly developed Scientific Laboratory of Structural Engineering**. It allows to implement research activities of various scales and complexity on safety of building structures and their operation under sustained loading, as well as to supervise research of doctoral students, for example within the framework of LLU internal grants. One of projects is "*Analysis of the effect of graphene and steel short fibers on the stiffness of reinforced concrete structures*" Z49 (01.06.2020. – 31.05.2022.) of the LLU programme "Strengthening of scientific capacity at LLU".

Within the theme of **concrete construction products**, in cooperation with industry companies, innovative solutions are also being worked on, such as **3D printing technology** and process

research (TEP79) (SIA "3D Tech"). Similar cooperation is formed within other research topics in this field, for example, by implementing contract research in **the field of wooden constructions** - Expertise of wooden constructions of the Ministry of Education and Science (No. 3.2-10 / TPK-16) (SIA "CMB"), as well as conducting doctoral research within the framework of LLU internal grants - project *"Methodology for determining the torsional stiffness modules of moment connection of wooden elements Z37* (03.06.2019 - 31.05.2021).

The findings and results obtained in these studies are also included in the content of several study courses, for example, *Building Structures I, II, III, Qualification Work*.

Sustainable building, development of new, innovative building materials and research of their properties.

Lecturers of the Department of Architecture and Building of VBF, doctoral students, master students, as well as in some researches also undergraduate students are involved in the implementation of their research. Experimental and theoretical research has been carried out, the results of which have been useful for civil engineering companies, and are reflected in reports at conferences, publications and master's theses, as well as in future doctoral theses.

One of the topics of the direction is **the development of innovative building materials from local biomaterials**. Under this theme, the academic staff of the program was involved in ERDF projects *"Development of new composite materiāls om foam gypsum bases with fibrous reinforcement and their systems"* (No. 2010/0320/2DP/2.1.1.1.0/10/APIA/VIAA/107) (01.01.2011-31.12.2013) and *"Innovative technology for complex processing of fiber plant residues into products with high added value"* (No. 2013/0044/1DP/1.1.1.2.0/13/APIA/VIAA/022) (22.01.2020.-31.01.2020.). Within the framework of this topic, the research of doctoral students within the framework of LLU internal grants *"Biocomposite Materials for the Building Wall Constructions"* (Z19) is also led.

The development of innovative building materials from local biomaterials is also linked to **the theme of sustainable building**. Within the framework of this topic, doctoral students' research within LLU internal grants is led - project *"Research and development of innovative low or zero heat eco-building construction technologies"* (G5), project *" Development of innovative technologies and their research of concentration and efficient use solar thermal energy in passive and active systems for build up energy efficient buildings"* (G9).

The equipment of the scientific laboratory of building materials also allows to perform research on the physical properties of various **composite building materials**. In co-operation with industry companies, an industrial study was carried out - testing of samples in accordance with the standard "LVS EN 12467+A2:2018 "Fiber - cement flat sheets - Product specification and test methods" (7.4 Tests for climatic performance; Requirement 5.5.2 Freeze-thaw for Categories A, B and D; Assessment method 7.4.1 Freeze-thaw; Compliance criteria 5.5.2 Freeze-thaw for Categories A, B and D and 7.4.1.4 Expression and interpretation of results)" (SIA "Skonto Concrete Cladding").

By attracting European Union funding, the project "Strengthening the research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions" (No. 1.1.1.4./17/I/003) implemented by LLU has **created a unique Acoustics Laboratory**, which allows to study sound absorption in large-scale construction products before they become part of the building. In the field of acoustics, the academic staff of the programme has been working on the analysis of experimental samples in the industrial study "Determination of the sound absorption coefficient of four experimental samples in an impedance tube".

The findings and results obtained in these studies are also included in the content of several study courses, for example, *Building Materials, Qualification Work*.

The academic staff of the programme regularly publishes the results of research work in scientific journals, as well as has presented reports at international scientific conferences. For example:

- International Conference on Safety and Durability of Structures, in Wroclaw (2014), Porto (2016), Jelgava (2018);
- International Association for Bridge and Structural Engineering – IABSE in Madrid (2014), Vancouver (2017), Christchurch (2020-21 online)
- 1st Pan American Congress on Computational Mechanics- PANACM 2015 in Buenos Aires in 2015
- International Conference on Chemical & process Engineering in Milan (2014, 2015)
- International Structural Engineering and Construction Conference ISEC in Honolulu (2013), Istanbul (2016), Chicago (2019);
- World Multidisciplinary Civil Engineering - Architecture - Urban Planning Symposium in Prague (2018) etc.

The academic staff also participates in international professional and scientific organizations and working groups, which allows to identify current issues in the field and the experience of foreign partners in the implementation of research. The academic staff of the programme works in organizations such as the International Association for Bridge and Structural Engineering (IABSE); Green Economics Institute England, Oxford (GEI); Nordic Association of Agricultural Scientists (NJF); The European Intellectual Property Teachers' Network (EIPTN); International E-learning Association (IELA); German Institute for Construction Technology (Deutsches Institut für Bautechnik); Azerbaijan State Agency for Control over Construction Safety of the Ministry of Emergency Situations.

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).

Due to the main general goal of the study programme, which is aimed at preparing high-quality and professional building construction managers for the Latvian economy, **the cooperation of the teaching staff within the programme is very close.** Given that the topics in the study courses are planned to be continuous, which means that each study course is based on the knowledge and skills acquired in the previous courses, then the teaching staff must cooperate to improve the quality of work. In order to promote cooperation, ensuring the interconnection of study courses, it is planned to integrate knowledge about BIM. This co-operation at the faculty level starts with the first year and continues until the final work.

The teaching staff of the civil engineering specialization within the study programme also **cooperates with the teaching staff of other LLU faculties.** For example, when learning the energy efficiency calculations of buildings both within the course projects and research works, the teaching staff cooperates with the teaching staff of the Department of Physics, using the laboratory equipment of the department and special computer programs. When working on the development and practical application of new building materials based on local biomaterials, the teaching staff of the civil engineering study programme cooperates with the teaching staff of the Faculty of

Agriculture. Cooperation with the Forest Faculty takes place in several directions: a combustion chamber located in the Department of Wood Processing is used for the practical training of building fire safety courses. The teaching staff from the same department solves the problems of using wooden constructions.

There is cooperation with the teaching staff of the Faculty of Agriculture and Engineering in acquiring the study course of construction of agricultural buildings. Acquiring economic study courses, there is cooperation with the Faculty of Economics and Social Development, as well as other LLU faculties. Cooperation takes place also in organizing scientific and practical conferences and seminars.

The academic staff of the programme **cooperate at the national, professional and university levels**. Members of the teaching staff are experts of the Latvia Science Council (LZP), full and honorary members of the Latvia Agriculture and Forest Science Academy (LLMZA), were experts in evaluation and accreditation of several study programmes in cooperation of the Ministry of Education and Academic Information Centre. The academic staff of the programme are involved in Evaluation Committees of diploma projects and qualification works at Riga Technical university and Riga Building College, as well as in editorial boards and scientific committees, for example, magazine of the building sector "Civil Engineer" (Būvinženieris), international scientific conference ICOSADOS, international scientific conference "Students on their Way to Science", etc. Also, cooperation takes place with professional organizations of the building industry and education organizations, for example, Association of Professors of Latvia Higher Education Institutions, Latvia Council of Economists, Latvia Association of Civil Engineers etc. Within the framework of cooperation members of the academic staff have participated as members of awarding committees in different competitions of the building sector, for example, Grand Prize of the Construction Industry (2015-2021), Building of the Year in Latvia (2015-2021), etc.

The teaching staff actively **cooperates with companies from the building industry** by organizing field trips for students with guest lecturers from companies, as well as conducting seminars in companies themselves. Several **lecturers give guest lectures in courses** organized by the Latvian Association of Civil Engineers, SIA CMB etc.

The academic staff in **cooperation with the Building Design Construction Council** organize traveling exhibitions in the premises of LLU Faculty of Environment and Civil Engineering and participate in **other popularization events of the construction industry**:

- Annual traveling exhibitions, such as "Places Changed by Buildings" (2019, 2020, 2021).
- Participation in the conference "Challenges in industrial civil engineering and solutions" (2019).
- Annual campaign "Learn Civil Engineering" - guest lectures, field seminars, study tours, traveling exhibitions for popularization of the specialization of civil engineering among young people (2018, 2019, 2020, 2021) (<https://www.buvniekupadome.lv/izglitiba/>) (in Latvian).

The **ratio between the number of students and the teaching staff** of first level professional higher education study programme Civil Engineering programme is 19.1 (on 01.09.2020.), overall in LLU it was 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	2_appendix_students_statistic_data_ENG.pdf	2_piel_statistikas_dati_studejosie_LV.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	3_appendix_compl_with_educatin_standard.pdf	3_piel_salidzinajums_ar_izglitiba_standartu.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable)	4_appendix_compl_with_profession_standard.pdf	4_piel_salidzinajums_ar_profesijas_standartu.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	5_appendix_study_courses_mapping.pdf	5_piel_studiju_kursu_kartejums.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	6_appendix_BUV_1LIM_study_plan_ENG.pdf	6_piel_BUV_1LIM_studiju_plans_LV.pdf
Descriptions of the study courses/ modules	7_appendix_BUV_1LIM_course_description_ENG.zip	7_piel_BUV_1LIM_kursu_apraksti_LV.zip
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	BUV_1LIM_ENG.pdf	BUV_1LIM_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	agreement_RTU_LLU.rar	vienosanas_RTU_LLU.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_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.		

Civil Engineering (42582)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Civil Engineering</i>
Education classification code	<i>42582</i>
Type of the study programme	<i>Professional bachelor study programme</i>
Name of the study programme director	<i>Silvija</i>
Surname of the study programme director	<i>Štrausa</i>
E-mail of the study programme director	<i>silvija.strausa@llu.lv</i>
Title of the study programme director	<i>Mg.sc.ing.</i>
Phone of the study programme director	
Goal of the study programme	<p><i>Aim of the study program: the strategic goal of the program is to provide professional studies in accordance with the economic, cultural, national defense and security needs, based on the theoretical foundations of science fields, professional standards (if any are approved by the Vocational Education and Employment Tripartite Cooperation Sub-Council) and that are applicable in practice to ensure the acquisition of fundamental and theoretical foundations of the field and to prepare comprehensively educated civil engineering specialists who:</i></p> <ul style="list-style-type: none"> <i>- are able to organize and manage construction-related work;</i> <i>- could continue their studies in Master's programme and would be able to conduct independent scientific research;</i> <i>- could continue self-education.</i>

Tasks of the study programme	<p><i>Tasks of the study programme:</i></p> <ul style="list-style-type: none"> • <i>To prepare students for the use of their theoretical knowledge, skills and abilities in civil engineering and related fields.</i> • <i>To provide a wide range of knowledge and understanding of the organization and management of construction work, applicable work execution technologies.</i> • <i>To develop and strengthen the skills and abilities of self-education and permanent work in order to create motivation for further education - in the professional master`s study programme Civil Engineering.</i> • <i>The graduate is given the opportunity to acquire the theoretical knowledge and practical skills provided for in the programme, and after receiving a diploma in building civil engineering and a Bachelor's degree, he or she is able to work successfully in: civil engineering companies; the design of buildings and structures; the field of scientific research in civil engineering science; pedagogical work and advisory services at various levels and structures; companies manufacturing building materials and constructions; companies trading building materials and constructions; administrative state, public and private structures managing and controlling construction; building maintenance and repair companies; real estate appraisal and trading firms; water supply and sewerage system reconstruction and civil engineering companies: civil engineering companies in managing various construction processes; design and technical inspection of buildings and structures.</i> • <i>Graduates of the programme have the opportunity to continue their education in Master's studies and work independently in research, as well as to continue their professional development in the industry's lifelong learning programmes.</i>
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Results of the study programme	<p>Knowledge:</p> <ul style="list-style-type: none"> • is able to demonstrate comprehensive and specialized knowledge and understanding of facts, theories, regularities and technologies relevant to the field of construction. <p>Skills:</p> <ul style="list-style-type: none"> • is able to comply with civil engineering regulations; develop civil engineering drawings; apply civil engineering terminology; create databases; ensure production sanitation requirements, fire safety norms and requirements; apply labour legislation, management and cooperation psychology; • is able to develop project documentation as a sketch or technical project; know civil engineering technology; know the properties of construction materials, to be familiar with their range, suitability and costs; know the essential requirements for structures; to know the constructive solutions of buildings; to know the organization and planning of construction works, to use financing and material resources sparingly, to implement quality management, to be familiar with geodetic and metrological works; draw up executive documents; • is able to communicate, build business relationships with customers, employers and subordinates; lead a working group; be able to analyze and solve problem situations; to plan, coordinate, manage one's own and others' work; develop and manage projects; be aware of quality assessment, systems, work safety, environmental protection; navigate the legislation. <p>Competencies:</p> <ul style="list-style-type: none"> • is able to formulate, describe and analyze practical problems, select the necessary information and use it to solve clearly defined problems, participate in the development of the field of civil engineering, show that they understand the place of a civil engineer in a wider social context.
Final examination upon the completion of the study programme	Developed and submitted a diploma project

Study programme forms

Full time studies - 4 years, 6 months - latvian

Study type and form	Full time studies
Duration in full years	4
Duration in month	6
Language	latvian
Amount (CP)	180
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 Civil Engineering
Qualification to be obtained (in english)	Building Civil Engineer

Places of implementation

Place name	City	Address
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Latvia University of Life Sciences and Technologies	JELGAVA	LIELĀ IELA 2, JELGAVA, LV-3001
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Part time extramural studies - 5 years - latvian

Study type and form	<i>Part time extramural studies</i>
Duration in full years	<i>5</i>
Duration in month	<i>0</i>
Language	<i>latvian</i>
Amount (CP)	<i>180</i>
Admission requirements (in English)	<i>General secondary education or vocational secondary education</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Bachelor Degree in Civil Engineering</i>
Qualification to be obtained (in english)	<i>Building Civil Engineer</i>

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 civil engineering specialty implemented by LLU has more than 45 years of experience in civil engineering education. Until now, LLU has implemented higher education in civil engineering at all levels - 1st level, 2nd level, bachelor's, master's and doctoral studies. By the time of submitting the accreditation report, several changes have been made in the existing study programs, envisaging to close one of them (the 2nd level professional higher education program Civil Engineering) in the near future, but to include its functions in the professional bachelor study program Civil Engineering. Thus, during the reporting period, **the duration of studies** of the professional bachelor study program Civil Engineering **was changed** and **a new form of implementation was created** - *Part time intramural studies*.

In the previous reporting period, the duration of the professional higher education Bachelor's study programme "Civil Engineering" was 5 years and amounted to 200 CP. In accordance with the international expert recommendations, as well as taking into account the general tendencies in the implementation of civil engineering higher education in Latvia, including the duration of the analogous study programme of the Riga Technical University, work has been done to implement changes in the 2019/2020 academic year in the professional Bachelor's study programme "Civil Engineering", and, on 13.05.2020, at the meeting of the Senate of the LLU, a modified study programme with a study duration of 4.5 years and a volume of 180 CP approved. Before, the study duration was 5 years (200 CP).

Since, it is planned to close the 2nd level professional higher education program "Civil Engineering", which was implemented only as part-time studies, then part-time studies from the study year 2022 / 2023 will be offered in the professional bachelor study program "Civil Engineering", which is currently implemented only as full-time studies. The parameters of the developed part-time implementation form are identical to the parameters of the full-time studies, the only difference is the duration of studies - *5 years for part-time studies* and *4.5 years for full-time studies*.

During the reporting period, **the qualification to be awarded in the study programme** was specified, which was changed from the qualification of a civil engineer to that of a *Building Civil Engineer*. It also corresponds to the standard of the profession of a building civil engineer corresponding to the level of education currently acquired in the programme (<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/ps0168.pdf> (only in Latvian)).

During the last three years, at the national level, the Ministry of Economics, in cooperation with professional organizations in the field (Latvia Association of Civil Engineers (LBS)), Latvian Builders' Association (LBA), etc.), has been intensively working on development and improvement of **the map of professions included in the civil engineering sector**, which marks the professions and specialists currently needed for the industry at different levels of education. Consequently, work is currently underway to clarify the standards of the professions included in the map or to develop

new standards for upcoming professions. This has also been taken into account in the refinement and revision of the program, reducing the study time, to bring the programme into line with new initiatives and revised standard of professional qualification. Updated professional qualification standard of the Building Civil Engineer is expected to be approved in these days.

Other parameters of the study program have not changed since the last accreditation.

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 total **number of students** in the programme has not changed significantly in the last six years, there are on average 135-140 students per year (*Fig.1*). According to the number of students, the civil engineering programmes implemented by LLU rank second in Latvia after the civil engineering programmes of the Riga Technical University (RTU). Both universities play an important role in providing civil engineering education in Latvia, as only these universities cover all levels of higher education in the field of civil engineering - from the 1st level professional higher education to doctoral study programmes. **LLU also provides separate courses within the framework of lifelong learning programmes.** The civil engineering study programmes implemented by LLU are practically oriented, with special emphasis on the design of agricultural buildings, the use of local biomaterials, including wood in construction, hydraulic engineering. Therefore, the number of students is optimal to ensure the acquisition of this specific knowledge, as well as the strengthening of practical knowledge by working in a small group of students.

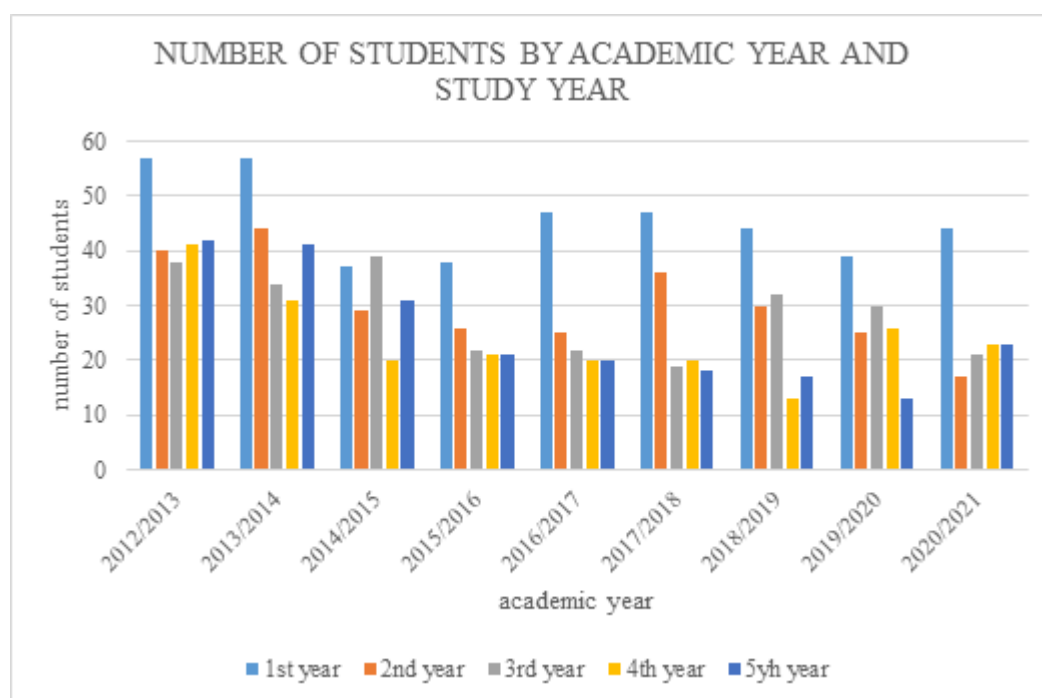


Figure 1. Number of students by academic and study years

The average **number of students enrolled in the first year** is about 45 students (*Fig.2*). The fluctuations in the number of enrolled students over the years are mainly related to the general situation in the civil engineering sector, which is extremely sensitive to changes in the economic

situation in the country, as well as being one of the sectors recovering the slowest after the economic crisis. As the economic situation deteriorates, the number of students decreases, while, as the industry develops, the need for specialists increases, which, in turn, affects the choice of young people in favour of studies in civil engineering.

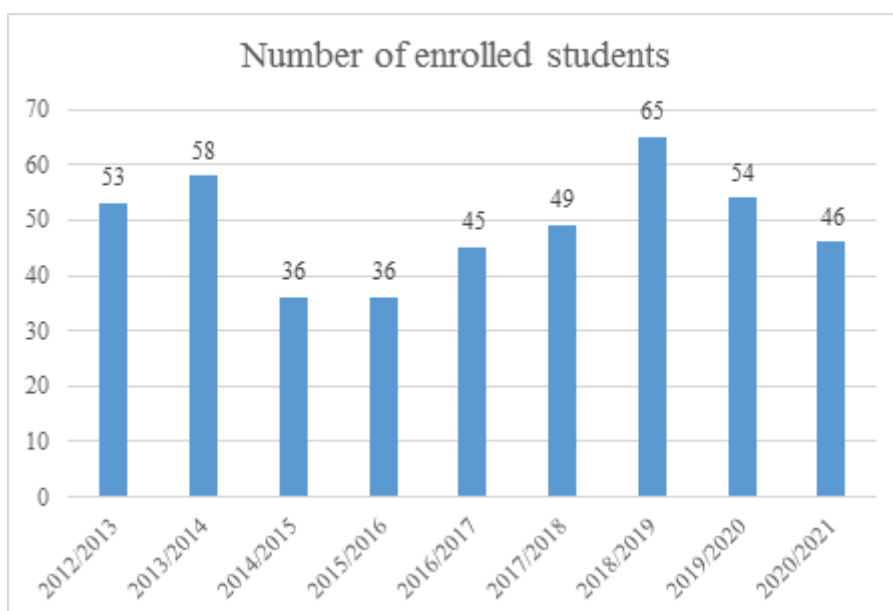


Figure 2 Number of enrolled students

A rather large decrease in the number of students is observed when moving from the first year to the second, also in the last year of studies. Analyzing and evaluating, **the decrease in the number of students** is mainly related to non-fulfillment of the requirements of the study programme, as well as non-fulfillment of financial obligations. Another reason is non-return from academic leave, as well as non-registration for studies for the next academic year. In later study years, these reasons are compounded by the inability to combine studies with work, as most senior students are already active in the industry. Given this circumstance, this issue is increasingly being discussed in the industry with employers in the industry, so that senior students receive support from their workplace for the successful completion of studies and the acquisition of a professional qualification of a civil engineer.

Students who do not meet the requirements of the study programme within a certain period of time become paid students and, financial problems sometimes become a reason for expulsion. In this situation, students are offered the opportunity to **transition from student status in the programme to listener status at the LLU Lifelong Learning Center**, which is actively used by some students. The status of a listener allows to acquire only those study subjects which, due to various reasons, have not been acquired as a student in the study programme, and due to which it is not possible to register a student for further studies for the next study year. After successful completion of these individual study courses, students can resume their studies. More full-time students use this opportunity to return to a state-paid place of study faster, which is only possible by studying without study debts. It is a great opportunity for students to choose the most appropriate type of study.

The research of the Ministry of Economics on the development of the labor market in the civil engineering sector shows the need for specialists of various levels in civil engineering in the coming years. Against this background, **the industry is working together to promote the civil engineering specialty among young people** by launching a "Learn Civil Engineering" campaign, in which civil engineering companies meet with schoolchildren to introduce the profession of a civil engineer. Educational institutions that implement various levels of civil

engineering education, including LLU, are also involved in this campaign. Cooperation also takes place with technical schools and secondary schools, where curricula related to civil engineering are implemented, for example, Saldus Technical School, Jelgava Technical School, Jelgava Secondary School of Technology, etc. Cooperation agreements have been concluded with several schools, and every year the best school graduates who are interested in the civil engineering are given the opportunity to enter the program outside the admission competition. The implementation of various campaigns has stimulated greater interest in the civil engineering specialty among young people. However, young people admit that one of the limiting aspects of choosing civil engineering studies is the level of knowledge of sciences, which is insufficient for some young people. However, in order to motivate young people to choose the civil engineering study programme, as well as to reduce the number of students dropping out in the first years of study due to non-acquisition of science subjects, in the 1st year there is a free opportunity for students to supplement their knowledge in mathematics and physics.

From the 2022/2023 academic year, it is **planned to start implementing part-time studies** in the professional bachelor's study program Civil Engineering. The demand for part-time studies in all previous years has been sufficient to implement the part-time 2nd level professional higher education study program Civil Engineering (about 10-15 new students were admitted each year). Part-time studies are attractive to those who are already working in the field or who have dropped out of their previous studies, but have now resumed their studies. Starting from the study year 2022/2023 all students of the 2nd level professional higher education study program Civil Engineering will be registered to the part-time studies of the professional bachelor study programme Civil Engineering.

Either, LLU is the only higher education institution in Latvia that offers graduates of the first level professional higher education study programmes Civil Engineering to enter the LLU professional bachelor's study programme Civil Engineering in the later stages and within 2 or 3 years, obtaining the qualification of a Building Civil Engineer. Such an opportunity is available both for the graduates of the first level programme of the Latvia University of Life Sciences and Technologies, as well as for the graduates of the first level professional higher education study programmes of the Riga Building College (RCK), Rezekne Academy of Technologies (RTA) and Vidzeme University of Applied Sciences (ViA). This is also confirmed by the cooperation agreements concluded with these universities.

Statistical data on students of the professional bachelor study programme Civil Engineering is available in the *Appendix No.1*.

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 professional bachelor study programme Civil Engineering reflects the normative framework and multifaceted nature of the construction industry, which is included in the study programme plan in the form of study courses and topics. The civil engineering specialty implemented by LLU has more than 45 years of experience in civil engineering education, initially developing as a field of agriculture / rural building. Currently, studies also look at the general principles of civil engineering, but in cooperation with the LLU's Agriculture, Forest, Engineering,

Information Technology Faculties, the initial agricultural construction sector has developed in a diverse way, not only by looking at the solutions of agricultural buildings, but also the use of wood in construction and the new use of various bioresources (flax, hemp, wood materials, etc.), the development of innovative composite materials and the research of their properties, etc. **Studies and research at all levels include several unique directions, which in Latvia are learned and studied in depth only at LLU.** These are the design of agricultural buildings, hydraulic construction, land reclamation structures, wooden constructions and structures of wooden buildings, the use of timber and other bioresources in the development of innovative building materials, acoustics. LLU **implements studies in the field of civil engineering at four education levels** (first, second level and bachelor's, master's, doctoral), ensuring mutual succession and the possibility to continue studies at a higher level.

The professional Bachelor's study programme "Civil Engineering" complies with the Cabinet Regulation No. 512 *"Regulations on the State Second Level Professional Higher Education Standard"* and the content meets the requirements for the mandatory content of a Bachelor's programme (*Appendix No.2*). The volume of the programme is 180CP, which corresponds to the standard. 40% of the study volume is contact hours. The compulsory structure of the Bachelor's programme consists of study courses, traineeship and state examinations. The compulsory content of Bachelor's studies is: general education study courses - 20 CP; theoretical basic courses of the discipline and information technology courses - 36 CP; professional specialization courses of the discipline - 79 CP (standard - 60 CP). Elective courses - 6 CP; traineeship - 24CP (standard - 20CP). State examinations - 15 CP (standard - 12 CP). During the Bachelor's programme the student develops and defends 10 course projects and 4 course papers. The student implements traineeship in accordance with the traineeship agreement. After completing the Bachelor's programme, a Bachelor's degree in civil engineering is awarded and a fifth-level professional qualification of a building civil engineer.

The professional higher education Bachelor's study programme "Civil Engineering" provides a *Bachelor's degree* and a *professional qualification of a Building Civil Engineer*. The **aim** of education is to create and develop a professional person who is able to think and to create and is able to solve civil engineering-related problems at the engineering level. Therefore, in the **admission** rules, the emphasis is on the assessments in mathematics and physics after graduating from high school. It leads to the selection of students with the ability to think in mathematical terms, which corresponds to the direction of studies in engineering. Graduates of the study programme become building civil engineers who meet the standard of the building civil engineering profession, 5th level of professional qualification (5.PQC) and 6th level of Latvian Qualifications Framework (6.LQF). *Compliance of the professional bachelor study program Civil Engineering with the profession standard of Building Civil Engineer* is shown in the *Appendix No. 3*.

LLU students have a great opportunity to transfer from one study programme to another by academic recognition of already completed study courses. For example, move from full time studies to part time studies in the professional bachelor's study programme Civil Engineering, in cases where a situation has arisen when studies must be combined with work in the field. The transition from one study program to another, the control of students' knowledge level and the recognition of study courses is also facilitated by the teaching staff who are involved in the implementation of the study process of the civil engineering study programmes of different levels and implementation forms. . The same principle is used for the graduates of the first level professional higher education study programme Civil Engineering by academic recognition of already acquired study courses, which allows them to enter in the professional bachelor study programme Civil Engineering in the later stages. It gives the opportunity to obtain the qualification of a building civil engineer in less than 5 years. Opportunities to start studies in later stages after graduating from the first level

professional higher education programme in the field of civil engineering are not offered in other Latvian higher education institutions. LLU has cooperation agreement with Riga Building College (RCK), Rēzekne Academy of Technologies (RTA) and University of Applied Sciences (VA) that allows graduates of those higher education institutions to enroll in later stages of the professional bachelor study programme Civil Engineering. There are students who choose to transfer from Riga Technical university (RTU) to LLU. Also in this situation, academic recognition of previously completed study courses takes place.

The tasks and results of the study programme are aimed at obtaining the qualification of a building civil engineer, which envisages comprehensive and specialized knowledge and understanding of facts, theories, regularities and technologies corresponding to the field of civil engineering. The study programme plan includes study courses and topics aimed at achieving the following **learning outcomes**:

- Comply with civil engineering regulations; develop civil engineering drawings; apply civil engineering terminology; create databases; ensure production sanitation requirements, fire safety norms and requirements; apply labour legislation, management and cooperation psychology.
- Develop project documentation as a sketch or technical project; know civil engineering technology; know the properties of construction materials, to be familiar with their range, suitability and costs; know the essential requirements for structures; to know the constructive solutions of buildings; to know the organization and planning of construction works, to use financing and material resources sparingly, to implement quality management, to be familiar with geodetic and metrological works; draw up executive documents.
- Communicate, build business relationships with customers, employers and subordinates; lead a working group; be able to analyze and solve problem situations; to plan, coordinate, manage one's own and others' work; develop and manage projects; be aware of quality assessment, systems, work safety, environmental protection; navigate the legislation.
- To be able to formulate, describe and analyze practical problems, select the necessary information and use it to solve clearly defined problems, participate in the development of the field of civil engineering, show that they understand the place of a civil engineer in a wider social context.

Studies in the specialty of civil engineering at LLU are practically oriented, providing competence-based education, because lecturers and doctoral students are closely connected with the practice, working in companies or performing research for entrepreneurs. In cooperation with alumni - entrepreneurs, study tours to companies, factories, guest lecturers from industry and traineeship both abroad and in the best Latvian civil engineering organizations, design and construction supervision companies (e.g. AS UPB, Skonto Plan, SIA Zemgales tehnoloģiskais centrs, etc.) are regularly provided.

Upon graduating from the professional higher education Bachelor's study programme "Civil Engineering", the intended **tasks of the programme** have been fulfilled, the goal and learning outcomes have been achieved:

- To prepare students for the use of their theoretical knowledge, skills and abilities in civil engineering and related fields.
- To provide a wide range of knowledge and understanding of the organization and management of construction work, applicable work execution technologies.
- To develop and strengthen the skills and abilities of self-education and permanent work in order to create motivation for further education - in the professional master's study programme Civil Engineering.

- The graduate is given the opportunity to acquire the theoretical knowledge and practical skills provided for in the programme, and after receiving a diploma in building civil engineering and a Bachelor's degree, he or she is able to work successfully in: civil engineering companies; the design of buildings and structures; the field of scientific research in civil engineering science; pedagogical work and advisory services at various levels and structures; companies manufacturing building materials and constructions; companies trading building materials and constructions; administrative state, public and private structures managing and controlling construction; building maintenance and repair companies; real estate appraisal and trading firms; water supply and sewerage system reconstruction and civil engineering companies; civil engineering companies in managing various construction processes; design and technical inspection of buildings and structures.
- Graduates of the programme have the opportunity to continue their education in Master's studies and work independently in research, as well as to continue their professional development in the industry's lifelong learning programmes.

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.

In 2014, significant amendments were made to the Construction Law, strengthening the conditions to be observed in the field of civil engineering. Amendments to the Construction Law affected the implementation of the civil engineering process, with special emphasis on the role of construction supervision and expertise, and the need for a unified digital communication platform for research, design, civil engineering, monitoring and management (BIS - building information system and BIM - building information modeling). Amendments to the Construction Law also affected civil engineering education, as it was necessary to integrate new findings and conditions into the content of the study programme, to develop digital competencies. Since the amendments in 2014, the civil engineering industry has been gradually improving the binding regulatory documents under the Construction Law. Among other things, in recent years, active work has been done on the development of occupational maps and occupational standards in the civil engineering sector in order to include the knowledge, skills and competencies required by law. Currently, the industry-initiated expert group is working on a new **professional standard "Building Civil Engineer"**, which details the knowledge, skills and competencies required to perform the duties and tasks of a building civil engineer defined in the labor market. Taking into account that the new professional standard is already in the harmonization stage, the requirements included in it have already been incorporated into the improved and updated professional Bachelor's study programme "Civil Engineering". When making changes in the study programme, at the same time a mapping of study courses has been developed, where the necessary knowledge, skills and competencies are

indicated for each study course, and the extent to which study courses must be acquired in accordance with the professional standard is indicated. **The main duties and tasks of a building civil engineer** are: project feasibility study - preliminary design, technical inspection and civil engineering research of buildings, engineering research on a construction site, design of buildings, parts of buildings, their constructions, construction management, commissioning and documentation preparation, construction supervision and construction control, scientific activity to support professional activity.

Appendix No. 3 contains information on the compliance of the qualification to be obtained in the professional Bachelor's study programme "Civil Engineering" with the professional standard "Building Civil Engineer".

The content of the programme and study courses is in close relation with actualities in the field of construction. The development strategy of the construction sector points to the lack of highly qualified specialists and managers in the sector. In 2020, the LLU research project no. 8.2.3.0/18/A/009 (SIA "Dynamic University") on labor demand trends was carried out. **In the field of construction, industry experts have pointed to a marked shortage of labour**, including - lack of specialists with higher education. Demand for the longer term in the construction sector is difficult to predict. However, according to experts, the most plausible scenario is an increase in labour demand with the possibility of cyclical fluctuations, which is typical for the construction industry as a whole, given its sensitivity to changes in the general economic situation. The labour market in the construction sector is strongly influenced by the overall economic development, the EU funds planning priorities and large infrastructure objects (for example, Rail Baltica), which account for a significant share of public procurement in construction. The results of **the survey of employers** in the sector "Civil Engineering" also indicate a possible increase in the demand for labor: 33% of employers indicated that the demand for highly qualified specialists will increase significantly, 20% indicated a small increase, but 40% indicated a constant demand for labour. To meet the demand of the sector for the number of specialists and increase in the quality of professional qualification, it is required to improve civil engineering education and the professional qualification system. In the nearest 10 years, the engineering knowledge of the civil engineering sector will have to integrate with new competences: **ICT technologies, smart technologies, energy efficiency, passive buildings**. Institutions offering civil engineering education have to improve their structural analysis and new technology programmes and simultaneously introduce the new social and digital competences. During the revision of the study programme and shortening the duration of its implementation, the study program plan and the content of study courses were also reviewed in accordance with these current events and trends in the field.

The main topicality for the coming years is integration of the sector with information and communication technologies (ICT), BIM (Building Information Model) platforms - research, designing, construction, supervision and management in a unified digital communication platform), which will improve the quality of projects and will make the construction organisation, transition of the building information system (BIS) to mandatory digital circulation of documents in the civil engineering sector, as well as introduction of other innovations. **The topicality of introduction of BIM** is also marked by more than 20 different Latvian institutions (professional organizations, ministries, academic and scientific institutions, etc.), including LLU, signing BIM roadmap in the autumn of 2019, which provides for measures for integration of BIM into the study process and practical implementation of projects. Introduction of BIM in LLU Architecture and Civil Engineering study direction requires significant resources. Therefore, over the course of the last years, through attracting funds of the European Union, the Faculty of Environment and Civil Engineering has set up high performance computer classes and acquired the software necessary for BIM in order to introduce BIM into the study content. To improve the professional skills and knowledge in BIM area,

the responsible teaching staff in the programme have completed traineeship at companies that are using BIM, and have participated in training courses in Latvia and abroad.

BIM thematic blocks are already integrated at all study levels and program content, where BIM is successively examined within various topics.

Likewise, the content of the new study programme is also in line with current international strategies, such as the **European Green Deal**, which, in turn, is linked to **Latvia's Sustainable Development Strategy** and several initiatives based on the introduction of **the circular economy in Latvia** (for example, the Latvia Bioeconomy Strategy). These include research into the use of wood, as well as various native biomaterials in construction, the development of new innovative building materials, such as new composite on foam gypsum basis with hemp fibre reinforcement. Also of constant relevance are the safety of buildings, energy efficiency of buildings, sound transmission and absorption in premises and other aspects ensuring the quality of the living environment, aimed at prevention of danger to health and life of every person.

The Development Strategy of the LLU for 2015-2020 pays special attention to the improvement of study programmes and expansion of the range of offers that prepare specialists for the promising bio-economy sectors included in the Latvian Smart Specialization Strategy, including construction based on the use of biomaterials. The professional Bachelor's study programme "Civil Engineering" provides a high level of design and construction of wooden structures, as well as the use of various ecological building materials in construction, for example, from local biomaterials - hemp, straw, etc..

The content of the study courses is regularly updated in accordance with the needs of the construction industry and the labour market, as well as the latest scientific innovations, technologies and development trends. For example, more extensive learning of construction mechanics, introduction of BIM, digitization of the industry (BIS). Study course programmes are regularly reviewed and updated in accordance with the learning outcomes of the study programme. A mapping of study courses (*Appendix No.7*) has been developed in the professional higher education bachelor's study programme "Civil Engineering" where the necessary knowledge, skills and competence are indicated for each study course, the extent to which study courses must be acquired in accordance with the professional standard is also indicated. In accordance with the needs of the construction industry and the labor market, as well as the latest scientific innovations, technologies and development trends. For example, increased acquisition of construction mechanics, introduction of BIM, digitization of the industry (BIS). Study course programmes are regularly reviewed and updated in accordance with the learning outcomes of the study programme. In the professional higher education bachelor's study programme "Civil Engineering", a mapping of study courses has been developed, where the necessary knowledge, skills and competencies are indicated for each study course, the extent to which study courses must be acquired in accordance with the professional standard is also indicated.

Since all academic staff members are also active in the construction industry - both in public and professional organizations, they attend both scientific and professional seminars and conferences, they are regularly informed about the development trends of the construction industry, labour market and science. Thus, the lecturers annually update the content of the study courses and literature sources in accordance with the novelties, they add new information and update the lecture material. It is especially important in the conditions of Covid-19 pandemic, when more attention was paid to this issue by inserting the latest information in the e-studies.

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 Faculty of Environment and Civil Engineering of the LLU has accumulated many years of experience in implementing the professional higher education study programme “Civil Engineering” which prepares civil engineers. The aim of the study programme is developed in such a way as to ensure professional studies corresponding to the needs of the national economy, cultural, national defense and security needs, as well as social needs, based on the theoretical foundations of the discipline, corresponding to the standards of the profession and applicable in practice. With the development of the economy, despite external factors, the demand for specialists working in the field of civil engineering has increased. There is a particular demand for civil engineers, construction managers and construction project managers, because the qualification of a building civil engineer can be used more effectively in project management, planning and organization, as well as in building design.

The aim and tasks of the programme are also related to the granting of existing civil engineering practice certificates in Latvia, which would provide job opportunities for the graduates of the programme. The Civil engineering Specialists Certification Institution of the Latvian Union of Civil Engineers (LBS BSSI) performs the certification of applicants and supervision of the independent practice of certified civil engineering specialists in accordance with the Cabinet of Ministers Regulations No. 169 Regulations for Assessment of Competence of Civil engineering Specialists and Supervision of Independent Practice. The Regulations specify that a person may apply for a **construction practice certificate** in the field of civil engineering design, construction work management and construction supervision, if the person: has acquired a **first or second level professional higher education** corresponding to the specialty in a civil engineering study programme; has acquired work experience of at least two years during the last seven years, fulfilling the minimum practical work experience programme specified by the competence examination institution.

Graduates of the Bachelor's study programme “Civil Engineering” are able to continue their education in appropriate Master's study programmes, as well as acquire lifelong education.

Plan of the study programme (*Appendix No.4*) and **study course programmes** (*Appendix No.5*) are designed so that **each of the following complements and continues into the next** (schematic structure of the programme and continuity of study courses is shown in the *Appendix No.6*). For example, by introducing BIM training in the study programme, it is planned to make it continuous for all study years, starting from the first year. These are the study courses: *Basics of Architectural Design* and *Architecture*. In these courses the students are taught to design residential and industrial buildings in 3D modeling programmes. Further on, in the study course *BIM Coordination* the communications networks are designed into these buildings in the framework of the courses *Heating and Ventilation*, as well as *Water Supply and Sewerage*. Then study courses *Construction Site Processes*; *Construction Technology I, II and III*, *Building Information Modelling (BIM)*. In BIM technologies, a working design of a production building is developed. All previously acquired knowledge will be used in the final work *Diploma Project*.

Similarly, the acquisition of knowledge, skills and competencies of building design are implemented throughout the study courses. For example, *Mathematics*; *Physics*; *Basic Theory of Structures*;

Selected Topics in Strength of Materials; Conceptions of CAD (Computer Aided Design); Structural Analysis; Engineering geology; Soil mechanics and foundations; Reinforced concrete and masonry structures; Metal Structures; Actions on building structures; Wooden and plastic structures; Special Building Structures; Inspection and Testing of Building Structures. The studies result in the final work- the *Diploma Project*, where all applicants must be able to calculate and design the main load-bearing structures of a building.

Such acquisition of study courses ensures the implementation of the goals of the study programme. **Study course mapping** in correlation with the results achieved in the programme is available in the *Appendix No.7*).

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 methods of the study programme **implementation** are also based on the gradual and project-oriented acquisition of knowledge, skills and competencies, which are realized through the following principles:

- The study courses are designed according to **the thematic principle**, as well as so that each **subsequent course complements and continues the previous ones**. For example, by introducing BIM training in the study programme, it is planned to make it continuous for all study years, starting from the first year. Similarly, the acquisition of knowledge, skills and competencies of building design, and other study courses are implemented throughout the study courses.
- **Organization of study courses** - lectures are combined with practical or laboratory work, as well as study and course work, which allows to strengthen the acquired theoretical knowledge in practice. In the spring of 2020, due to the Covid-19 pandemic, it was necessary to make significant improvements in the organization of the study process and resources to improve study materials and ensure their availability. It was necessary to review the study materials, especially the practical works, so that they could be implemented remotely or individually. New learning approaches were implemented using the possibilities of LLU Moodle e-learning environment. Therefore, currently the study course materials are available in the e-learning environment, they have been improved and the lists of information sources have been updated in accordance with the requirements of the Construction Law and related regulations of the Cabinet of Ministers, modern trends and available literature in the LLU Library and Faculty of Environment and Civil Engineering Information Center. For the qualitative implementation of distance studies, the methodological instructions for the acquisition of lectures and practical classes, for the remote completion of final examinations and exams have been revised and improved, which significantly reduces the student's chances of taking examinations unfairly.
- **In part-time studies, sessions are organized** in the form of sessions, which take place twice a year for three weeks. During the sessions there are lectures, laboratories and practical works or seminars. During the intersessional periods, the students independently perform the assigned tasks, the acceptance and assessment of which takes place in

accordance with the instructions of the lecturer - either before the next session or during the next session. Faculty members are available for consultations both during sessions and between sessions in the e-learning environment, e-mails or face-to-face consultations (Covid-19 restriction period - remotely, using LLU e-learning online tools). During the session, lectures are combined with practical or laboratory work, as well as study and course work, which allows to strengthen the acquired theoretical knowledge in practice.

- In order to provide practical bases for the theoretical knowledge of the students, the study process includes **guest lectures from specialists working in various companies**. Each study year, students listen to about 20-30 guest lecturers on topics related to the study plan and theoretical study courses. For example, sustainable building, BIM, building materials, technological processes in dairy farms and their constructive solutions, production technology and application of reinforced concrete, steel structures, energy efficiency of buildings, etc.
- To learn the study courses, lecturers and students use LLU **Moodle e-studies** (*especially relevant during the Covid-19 pandemic*), which helps to publish materials and video lectures for students, to conduct online lectures and seminars, students are able to submit their work, and lecturers - to publish the evaluation, as well as to provide feedback and individually communicate with each student. For the evaluation of the acquired knowledge, as well as for self-examination, various tests are published in e-studies, the questions of which are regularly supplemented. The Moodle e-learning tool Attendance is used to control the attendance of lectures. Other digital tools are also used in some study courses, for example, separate tests in chemistry have been developed in the Kahoot application.
- **To facilitate communication**, each student and lecturer has an LLU e-mail, it is also possible to communicate in the e-learning environment.
- **The study environment is** organized to ensure maximum consolidation of theoretical knowledge in practice. High-performance computer classes for learning BIM software have been created, study and scientific laboratories have been developed, and free access to library resources has been ensured, including outside the premises of the LLU.
- **Students provide their assessment** of the content of the study course and the lecturer's work at the end of each semester, which helps to improve the content of the study course and teaching methods.

The **principles of student-centered education** in the study programme are implemented as follows:

- Taking into account and respecting the diversity of student contingents and their needs in developing appropriate learning approaches, studies often use **an individual approach**, which can be ensured by working in small work groups or advising students individually. It is offered to acquire separate study courses also through the LLU Lifelong Learning Center. Study methods are also adapted in situations where face-to-face training is not possible (for example, in the case of Covid-19).
- Respecting the needs of students, the study environment accessible to each student is ensured, **the accessibility of the environment in the premises** is also ensured. Respecting the opportunities for students to attend studies and use study and scientific equipment, as well as study infrastructure - access is also provided outside working hours. VBF provides support mechanisms and services for students with special needs and students from various social groups, the library and its resources are easily accessible to students, there is also an information center at the Faculty of Environment and Civil Engineering.
- **Lecturers are available for students** for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail. Students' independent work is planned and structured, as well as students are provided with both

mandatory and additional consultations, providing lecturer's support. Consultation times of each lecturer are available in the LLU information system.

- In order to structure the students' learning process and facilitate students' sequential and regular acquisition of the subject, **study course schedules have been prepared in each study course with the topic of each week**, the work to be performed and evaluated, and the conditions for the completion.
- Promotes the student's independence, at the same time providing guidance and support by lecturers.
- Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of academic recognition of study courses when returning from mobility.
- **The review of student complaints** is regulated by the LLU Study Regulations (<https://www.llu.lv/en/study-guide-documents>), however, complaints are also reviewed by the commission. In addition, students are invited to escalate their problems sequentially - to the director of the study programme, head of the department, vice-dean, dean and vice-rector for studies;
- Ensuring mutual respect and participation of students and lecturers, the LLU Code of Ethics has been developed (https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf)
- **Students participate in surveys**, discussions and evaluate the study process. In order to ensure the participation of students in the improvement of the study process, the director of the study programme regularly listens to the students' suggestions and explains possible solutions for improving the studies.
- Students studying civil engineering can participate in the improvement of the study process through the Student Self-Government, which delegates its representatives to the Council and the Scholarship Council of the Faculty, LLU Council and Senate.
- Student **evaluation criteria** are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria for each study work, at the start of the study course. The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works. The final works are evaluated by a commission of several members, which helps to avoid subjective evaluation.

LLU has developed Study Regulations, which envisages the **assessment** of students' work using qualitative and quantitative evaluation methods:

- The forms of control of independent work are - control of laboratory and practical work, examination of understanding of issues in seminars and tests, development and defense of term papers and projects, test or exam at the end of the study course, defense of study traineeship.
- **For the qualitative evaluation**, 10-point scale is used (*points from 1 to 10, successful evaluation starting with 4 points*) or the pass / fail evaluation (https://www.llu.lv/sites/default/files/2020-06/16_Study_Regulation_0.pdf). All final theses, projects and individual practical works are evaluated with a mark. Laboratory work, which is mainly performed in person, is often assessed by pass/fail. If part of the work in the study course is intended to be performed as group work, there is always also an individual work which is assessed with a mark and which has a greater decisive role in the final assessment.
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS). In total, the study program is mastered if the study courses in the amount of 180 CPs

(270 ECTS) have been successfully completed.

In addition, the **attendance** of the study course is controlled throughout the course, as well as the developed test papers and / or exam paper / course project are submitted within the specified time.

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.

An obligatory component of the professional Bachelor's study programme "Civil Engineering" is an professional traineeship outside the educational institution, in accordance with the Cabinet of Ministers of the Republic of Latvia Regulations No. 512 "Regulations on the State Second Level Professional Higher Education Standard" (26.08.2016) and LLU "Traineeship Regulations" (*Appendix No.8*). The professional traineeship in the programme "Civil Engineering" in the amount of 24 CP is planned for full-time students in the following directions - *Engineering Geodesy* 3CP; *Engineering Geology* 1CP and *Construction Management* 20 CP.

The general goals of the traineeship are: to ensure the combination of students' theoretical knowledge with practical work in order to assess the possibility to apply the knowledge acquired at the university in practice; to acquaint students with the real situation in construction companies and employers with the potential workforce; to enable entrepreneurs to involve students in the performance of daily work duties, thus assessing the potential of their work abilities; to promote co-operation between construction companies and an educational institution in order to be able to better understand the wishes and needs of entrepreneurs regarding new specialists; to get acquainted with the construction organization, its organizational scheme, the volume of the work performed, the place of the construction organization in the Latvian construction market; to acquire the necessary skills in construction management; to strengthen, expand and systematize theoretical and practical knowledge; to acquire skills in organizing civil engineering work on construction sites; to acquire the materials required for the development of the diploma project in line with the individual tasks - both for the individual task issued by the traineeship supervisor of the construction organization and for the individual task issued by the diploma project supervisor. In order to better achieve the set goals, students are involved in the daily work of the company, entrusting them to perform various independent duties and tasks related to the practical aspects of work, involving them in paid work.

When going on traineeship, the Rector's order is prepared and issued, students are given an traineeship assignment and a tripartite agreement is prepared (LLU - Traineeship company - student). After the traineeship, the student submits an traineeship report by the deadline set by the lecturer and defends the traineeship within the time specified by the lecturer. Practice reports are accepted by at least two lecturers.

Students of the professional higher education Bachelor's study programme "Civil Engineering", in accordance with the requirements of the study programme, in the spring semester of the 4th year during the professional pre-diploma traineeship develop an traineeship report / overview and, at the end of the traineeship period, defend it. The aim of developing a professional pre-diploma traineeship report is to acquire skills and abilities in the systematization and practical application of theoretical knowledge. The report of the professional pre-diploma traineeship is developed during

the traineeship period and submitted in writing in accordance with its content, design and other requirements. The traineeship report is a reflection of individual, practical and cognitive work. According to the study course programme, in the development of the above mentioned reports, the students are able to: select and compile statistical data and various other reports; to analyze and evaluate various indicators important for companies; to compile, analyze and evaluate the economic activity and development indicators of enterprises (organizations, institutions); to show the ability to use the information technologies and theoretical knowledge available for this purpose in the relevant subjects; draw conclusions and make proposals.

The works meet the following requirements: reflect the knowledge of specialized civil engineering literature, economic information and other sources; reflects the ability to collect and analyze information using appropriate research methods and technical means; contains specific, topical problems for independent or group research; contains an accurate, clear and logical presentation of the course and results of the research, the author's conclusions and proposals arising from the research results; demonstrates the ability to use civil engineering, marketing, accounting, logistics, personnel management and other methods and information technologies, as well as foreign experience in solving specific issues; demonstrates the ability to work creatively, conducting research and developing activity programs. After the traineeship the student has: strengthened, expanded and systematized theoretical and practical knowledge and critical understanding of civil engineering work processes, technology, civil engineering work planning, organization and management on the construction site, acquired the necessary skills in construction management and organization on the construction site, acquired skills in construction work organization on construction sites, has the necessary competence cooperation to prepare a diploma project under the guidance of the diploma project supervisor, to collect the materials necessary for the development of the diploma project in accordance with the individual task, as well as to develop the individual task issued by the manager of the civil engineering organization.

Construction management traineeship is one of the purposefully and sequentially implemented work environment-based study activities of the Faculty of Environment and Civil Engineering of the LLU. LLU supports students to achieve the tasks set within the study traineeship by offering traineeship places in the largest cooperation partner companies (JSC UPB, Skonto Plan, Merks, etc.), as well as allowing students to choose traineeship places themselves, in accordance with professional activities and traineeship programme. In co-operation with the construction industry and local governments, several activities are being implemented in providing qualification traineeship opportunities. Every year, traineeships are provided by an average of 25 construction companies in Latvia. Some companies also have representative offices abroad, and every year 7 students also use the mobility opportunities of the ERASMUS + programme for traineeships abroad, which allows students to supplement their knowledge, skills and competencies in the international environment.

Cooperation with construction companies - qualification traineeships: SIA "Vinder ER", SIA "VIA-S modular houses", IU Arhitekts Viktors Bērziņš, SIA "SCELLANET", SIA "Selva Būve", SIA "ARTCORE", SIA "MK dizains", SIA "Kokile", SIA "ARBEKA", SIA "M un N", SIA "Pēkaiņi", SIA "NORTHPROJECT", SIA "Būvkore", "KVINTETS M", SIA "More Energoremonts Rīga, SIA "Ventspils nekustamie īpašumi" pašvaldības", SIA "Skonto Plan LTD", SIA "SCO Centrs", SIA "ERBO", SIA "JOE", SIA "Metalux", SIA "Bukoteks", SIA "YIT Latvija", SIA "ENERGOREMONTS RĪGA", SIA "ULRE", SIA "SCELLANET", SIA "ERI AUTO", SIA "EMPOWER", SIA "Tilts", SIA "MODHUS", Menard Polska Sp.z.oo. (Poland), PLENAB AB (Sweden) etc..

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' **diploma projects reflect the current events in the field**, because all **situations and projects are real**, related to certain customers and are **developed as a variant of a project**. In their Diploma projects students work on the third group of buildings of various types (according to the General Construction Regulations of Latvia), for which calculations of building structures are performed, civil engineering technological maps, construction general plan and economic calculations are developed. Students prefer to design industrial and public buildings, while residential and agricultural buildings are selected less often (*Table 1*). Most of the members of the Thesis Evaluation Commission are representatives of the labour market, whose opinion is taken into account when choosing next year's topics. The average evaluation of the final theses of each year indicates the quality of graduates and their work ethic.

Table 1

Topics of diploma projects

Study year	Industrial buildings	Public buildings	Residential buildings	Agricultural buildings	Average mark
2014/2015	9	15	3	4	7,61
2015/2016	3	7	4	7	8,38
2016/2017	7	14	1	1	8,26
2017/2018	7	7	5	1	8,10
2018/2019	8	6	3	2	7,19
2019/2020	8	8	-	1	8,0

The topics of diploma projects reflect civil engineering trends in Latvian municipalities, and they variations from year to year. For example, there have been years when there is more funding for farm buildings that are part of a block of industrial buildings. As an example, the topics of the final theses of the academic year 2019/2020 are listed below:

- Industrial and production buildings: Furniture production building in Sigulda; 3.5 MW boiler house in Kandava; Rubber pellet production building in Ventspils; Wood pellet production building in Daugavpils, Viršu Street 56; Sawmill in Tīnūži; Concrete bicks production building in Inčukalns; Heat accumulation station in Jelgava; Particleboard briquette production building in Valmiera; Industrial building in Ventspils.
- Public buildings: Sports center in Ādaži; Typography with office building in Ventspils; Car center in Riga, Biķernieku street 125; Project of Jelgava market complex in Zemgale prospect 19a; Jelgava Technical School sports hall; Cinema building in Tukums.
- Agricultural buildings: Cattle farmbuilding in Ventspils.

Each year, the best qualification works are marked in the reports of the Examination Commission. For example, in 2019, the following diploma projects were marked as the best works:

Multifunctional cultural center in Ventspils municipality and Tennis hall in Cēsis. Upon receipt of the Diploma, **the honorary diplomas from the Latvia Association of Civil Engineers (LBS) are also awarded to the best graduates**, thus stimulating higher achievements. The best works are also published in the LBS magazine "Būvinženieris" and are awarded in competitions of industry professionals.

Until 2020, the **research work of students** required to obtain a Bachelor's degree was developed in a separate study course *Research Work* 3CP. Within the framework of this work, various building materials, civil engineering solutions, construction processes, regulatory framework is analyzed, evaluated, technically and economically compared.

The research topics in the academic year of 2019/2020 were very diverse, closely related to the study process and aimed at the goal of the study programme: preparation of highly qualified building civil engineers. Themes:

Possibilities of BIM computer software REVIT and Tekla Structures in designing reinforced concrete building structures. Methods for evaluating the shear strength of prefabricated reinforced concrete wall joints; Physical properties of hemp splints for use in concrete as aggregates; Application of automated design in building design; Determination of acoustic parameters of the Faculty of Environment and Civil Engineering 7th floor and 8th floor corridors; Determination and improvement of acoustic parameters in the Faculty of Environment and Civil Engineering lobby; Latvian and Lithuanian building regulations systems - similarities and differences; Fibrolite slabs, their composition, production, properties and applications; Production of fibrolite sheets and comparison of material properties; Minimum requirements for BIM project; Comparison of Latvian and Estonian civil engineering standards; Digitization of the civil engineering process in the building information system; Expanded clay block production, their properties and composition; Compilation of technical and economic estimates in comparison with Scandinavian countries; Impact of the emergency situation on the construction industry; The role and significance of planning in the construction process, practical aspects.

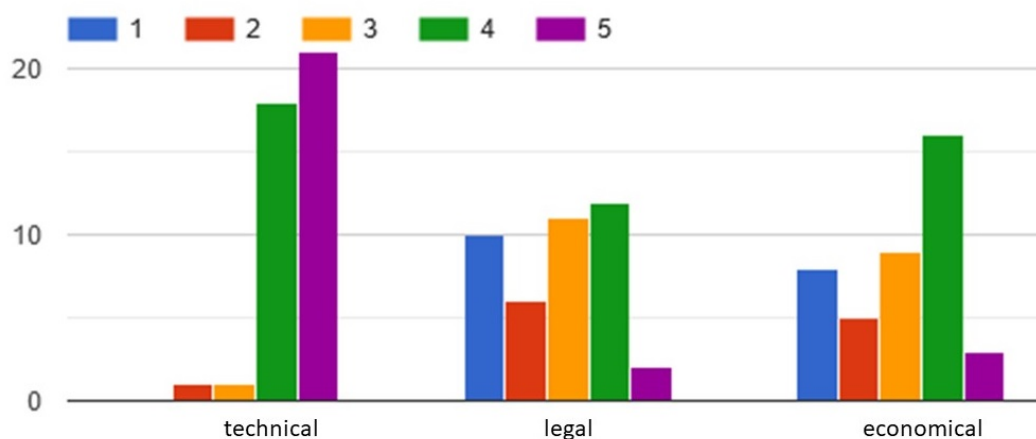
Starting from the academic year of 2020/2021 students will develop their research work in study courses *Scientific Work in Specialty* and *Principles of Scientific Work*.

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.

Student surveys are related to the quality of the teaching staff and study courses. Such surveys are conducted twice a year, at the end of the study semester. Evaluating the results of the survey and drawing conclusions, work continues on improving the approaches to teaching study courses. For example, to understand whether improvements in the organization of distance learning during the Covid-19 pandemic in the academic years of 2019/2020 and 2020/2021 have been effective, a student survey was conducted. The results show that, despite distance learning and restrictions on the implementation of practical activities, almost all students are fully satisfied (62.5%) or more satisfied than dissatisfied (37.5%) with their choice of the higher education institution and fully satisfied (52.5%) or more satisfied than dissatisfied (40%) with the choice of the study programme. *Student satisfaction with studies* marks the positive impact of the improvements made on the implementation of the study process in exceptional circumstances.

Graduate surveys have also been conducted. One group of respondents consisted of people who graduated in 2018-2020, the other - of people who graduated since 1980. One of the main questions was *whether the graduate's current job is related to the civil engineering specialty*. In the first group, all the answers were - very closely, in the second group most of the answers - very closely, but some respondents selected the option - somewhat, and one respondent said - not at all. From the answers it can be concluded that the majority of graduates work in the chosen specialty after graduation. The next most important issue was related to *the position, when starting the work*. It can be concluded from the answers that in both groups about half started out as assistants to construction managers and half were design engineers. Most graduates work in private companies involved in design or civil engineering. Most popular positions in the current job are designers, estimators, control and supervision engineers, consulting, inspection. There are also graduates who indicate that the position is related to solving strategic problems and managing production. In order to reflect the wide range of activities in the field of rural construction, **graduates of the study programme are invited as guest lecturers** in seminars and separate guest lectures to share their experiences with the current students on topics that are currently relevant.

Graduate surveys also include *questions related to the knowledge, skills and competencies acquired in the study programme, their assessment*. Knowledge was ranked in groups: technical; legal; economic; work organizations; computer science and the humanities (Fig.3). The acquired technical knowledge was highly valued and also recognized as the most necessary. Skills in work organization and computer science are also quite appreciated. Legal and economic knowledge was assessed differently. The importance of technical knowledge in the content of the study courses of the programme has been high so far, because within the study programme course and study projects are developed, which are basically real civil engineering projects that require high technical knowledge to ensure quality result. The knowledge gained during the study process in project development, as well as digital and computer skills have been the basis for high employment of graduates in the field, which we can also see from the results of the survey. **According to the results of the survey, the content of the study programme is constantly improved, as well as the technical base necessary for the implementation of studies is reviewed** - laboratory equipment, computer classrooms and software, the latest literature and other materials.



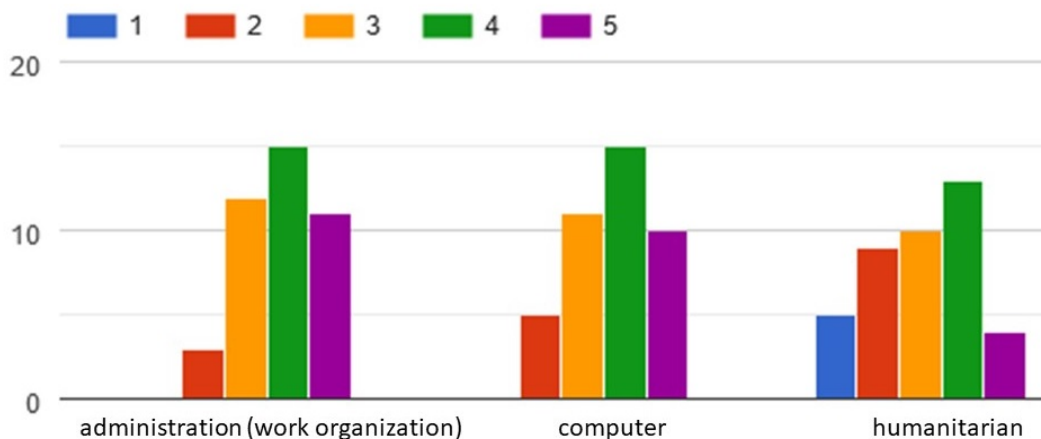


Figure 3. Answers to the question: “Assessment of the most necessary knowledge in the current job” (1 – weak, 2 – satisfactory, 3 – average, 4 – very good, 5 – excellent)

Employer surveys show an increase in the labor market demand for highly educated specialists. The specialist must be competent in the relevant education in the field, he or she must have good engineering knowledge, especially in design. They must be competent in communication and teamwork, be honest, responsible and accurate. The specialist must have mastered BIM technology and 3D modeling programmes, the ability to combine theoretical knowledge with practice, they must have a quality-oriented attitude.

In the focus group discussion with the industry representatives, the **ability to specialize** (e.g. design, buildings, heat, water, gas, construction management, etc.) and, at the same time, to maintain a broader view of the industry as a whole was mentioned as an important competence. Other important skills that were mentioned were **the knowledge of BIM**, ability to link theoretical knowledge and practical civil engineering. Based on the results of the survey, **changes were made in the LLU professional Bachelor's study programme** by introducing several **BIM-related study courses** in the study plan: *Basics of Architectural Design*, *BIM Coordination*, *Building Information Modelling (BIM)*. Computer classrooms were also equipped with appropriate design software.

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 mobility of students in the Civil Engineering bachelor programme is mainly related to the ERASMUS + agreements concluded by the LLU, as well as to international tripartite cooperation agreements in the organization of conferences and **summer schools**. Students also have the opportunity to participate in the **European Project Week (EPW)**, organized by universities from 5 countries with a specialty in civil engineering, where the organizing committee also includes a professor from the LLU study programme “Civil Engineering”.

ERASMUS+ mobility agreements have been concluded in all sub-directions of the strategic direction “Architecture and Civil Engineering” and, in general, provide mobility opportunities for

both students and teachers to 65 universities in 21 European countries. The list of available mobility universities is available at LLU website <https://www.llu.lv/en/exchange-studies>.

Within the **ERASMUS + mobility** program, a total of 36 students from the professional Bachelor's study programme "Civil Engineering" have participated (*Table 2*). Universities whose study programmes have been selected: Wroclaw University of Environmental and Life Sciences in Poland; University of Tras-os-Montes and Alto Douro, University of Porto in Portugal, VŠB-Technical University of Ostrava, in Czech Republic; Akdeniz University in Turkey; Aleksandra Stulginskis University in Lithuania, Beyond Event SAS in France; Technische Universitat Braunschweig, in Germany. Within the framework of **ERASMUS + student mobility, 14 students went to study** at foreign universities, but in **22 students participated in traineeships in companies**.

Table 2

The mobility of students in the Civil Engineering bachelor programme

Study year / mobility type	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	Total number
Studies	2	4	0	0	2	2	4	14
Traineeship	6	5	3	1	0	0	7	22
Total number	8	9	3	1	2	2	11	36

Incoming and outgoing mobility opportunities for students meet the student demand. The dynamics of the number of opportunities used shows increased student activity by years, the desire to study abroad is growing. Recognition of study courses acquired during mobility differs from semester to semester: it is more problematic to compare study courses related to the design of building structures due to the different content of study courses in different universities. Therefore, students generally use their fourth year to study abroad, when the study courses concerning building constructions have already been acquired. Also, students who have participated in the Erasmus + programme have the opportunity to acquire courses free of charge in the next semester, if, for various reasons, it has not been possible to equate them with the courses acquired at the foreign university.

The choice of students to do traineeships in foreign companies is very successful. The duration of the traineeship is 20 weeks, which is long enough to acquire work skills in the country, improve language skills, communication skills, get acquainted with the architecture and construction of the country. Civil engineering students have worked in France, in the very center of Paris in the reconstruction of a bank and used this experience in the development of a diploma project. Several students have worked in Germany, near Hanover and Braunschweig, for companies involved in the assembly of glass structures. Taking into account that LLU has an ERASMU + agreement with Braunschweig Technical University, the students used these contacts to learn about solving energy efficiency issues and designing passive houses, which is very well developed subject of the Construction Physics study course of this university.

Outgoing and incoming student mobility on the basis of cooperation agreements without ERASMUS + funding:

Collaboration with the University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and Wrocław University of Environmental and Life Sciences in Poland and the LLU Civil Engineering study programme in organizing an international scientific conference ICOSADOS (*International Conference on Safety and Durability of Structures*) and reviewing scientific articles, as well as organizing and conducting **International Summer School of Building Engineering Students**

- *International Summer School for Building Engineering Students`19* (14-28 July, 2019, Latvia) - 5 students of the Faculty of Environment and Civil Engineering of LLU and **14 students from Poland and Portugal**.
- *International Summer School for Building Engineering Students`18* (9-20 July, 2018, Portugal) - 5 students of the Faculty of Environment and Civil Engineering of LLU.
- *International Summer School for Building Engineering Students`17* (9-21 July, 2017, Portugal) - 4 students of the Faculty of Environment and Civil Engineering of LLU.

The content of the summer schools was organized in a very purposeful and informative way. In Poland, students worked in depth on building inspections, surveying, and assessing the condition of structures. In Portugal, the tasks were related to the building materials and structures of ecologically constructed buildings. The selected villages were also located in Spain. As a result, students were able to learn about the traditional civil engineering in Portugal and in Spain. LLU had chosen tasks related to the application of wooden and metal structures in the construction of public and industrial buildings. Within the framework of the international summer school, students worked in international groups on work tasks, prepared and presented final presentations.

LLU study programs "Civil Engineering" has cooperated with the Engineering College of Copenhagen in Denmark, Edinburgh Napier University in Scotland, Lyon Technical University (IUT A Université Claude Bernard, Lyon) in France, Amsterdam University of Applied Sciences in the Netherlands, Burgos University in Burgos in Spain in the organization of **EPW (European Project Week)**. During the EPW, students from 5 universities (about 100 students) solve the problems of construction of large global-level objects in separate working groups, analyze, collect data and present the obtained results on the closing day. This type of cooperation has been going on for many years. EPW activities, in which LLU civil engineering students and lecturers also participated, have taken place in Edinburgh (Scotland), Lyon (France), Jelgava (Latvia), Amsterdam (Netherlands) and Copenhagen (Denmark). EPW is a very useful activity to promote international cooperation of students, but, as it does not take place within the framework of ERASMUS +, various external or personal funding is attracted for participation in this event. A positive aspect is the close cooperation with the graduates of the programme, whose companies financially support several activities implemented by the LLU civil engineering specialty.

Incoming mobility of students is mainly related to the cooperation between the University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and Wrocław University of Environmental and Life Sciences (Poland) and Civil Engineering programme of LLU (Latvia). In 2019 (July 14th – 28th) in Latvia, **the International Summer School for Civil Engineering Students** was held, where **14 students** arrived to Latvia from **Poland and Portugal**, including **two Spanish students** which were Erasmus+ mobility students in Portugal at the time.

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 resources of the study program consist of three groups - equipment, software and literature. Industry publications for studies and research work are available in the Subscription of the **Fundamental Library of the LLU**, Subscription of Study Literature, in the Reading Room, in the deposit library of the Food and Agriculture Organization of the United Nations. Reference literature and bibliographic references on various issues related to civil engineering and other fields are available at the Bibliographic Information Department. To search for information sources that are not available in the library collection, students can use the subscribed databases in the LLU network or outside the LLU network by using the personal accounts in the LLU information system (LLU IS). Information can be obtained at the Reference and Information Center of the Fundamental Library of the LLU, as well as interlibrary loan services can be used. The search engine LLU Primo Discovery, online databases BIS Aleph500, online databases created in the Fundamental Library of LLU (8 databases of different levels) are available for searching of scientific literature. When using the LLU IS user account, a number of subscribed databases are available: CAB Abstracts; CRC Press e-books; EBSCO databases; EBSCO eBook Academic Collection; ScienceDirect journals; Scopus; Web of Science and others. Faculty and students are informed about databases to which access is granted on a temporary basis. Databases of lecturers' publications and doctoral theses have also been created. The staff of the library provides consultations on current events, as well as advises students on searching for scientific information. The informative and methodological base of the LLU is detailed, transparent, and structured so that students can quickly obtain all the information related to their studies, get acquainted with the study course materials and study course requirements in the LLU e-learning environment, and the LLU Fundamental Library provides students with very a wide range of study and scientific literature and access to a variety of databases. The LLU Fundamental Library regularly supplements the range of various publications available to support students with sources for the acquisition of the civil engineering study programmes, as well as for research. The appendix contains books and study materials that have included in the range of materials used in the study direction during the reporting period.

Students may use **the Faculty of Environment and Civil Engineering Information Centre** that provides free access to the LLU Fundamental Library databases and specific industry literature - books, standards, scientific and industry journals; it is also possible to print large format works, such as study projects <http://www.vbf.llu.lv/lv/informacijas-centrs> (in Latvia).

During the reporting period, **the study and science infrastructure in the field of civil engineering was significantly improved** by attracting funding from the earnings of the Faculty of Environment and Civil Engineering (tuition fees, etc.), ERDF projects "Strengthening research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions" (No. 1.1.1.4./17/I/003) and "Modernization of STEM study programmes" (No.8.1.1.0 / 17 / I / 001), as well as from various other projects implemented at the faculty. Significant repairs have been made to improve study classrooms and laboratories; high-performance computer equipment has been purchased that supports the development of digital skills, including BIM; as well as acquisitions of equipment, tools and furnishing have been made. All classrooms necessary for the

study work are equipped with the necessary technical means for conducting classes - multimedia equipment, computer equipment, appropriate software and Internet access.

In general, several **study and scientific laboratories** are involved in the implementation of the study process of the programme:

The Training laboratory for construction materials is equipped with the equipment necessary for students to get acquainted with the composition of building materials, create test samples and perform various parameters testing of the manufactured samples. The following materials are used for laboratory work of building materials: mixers, sieve shaker, vibrating table, drying cabinet Snol E 58/350 E5CN, water bath, pressure test press P-10 and MOP-125, as well as automated control material strength parameters determination device CO89-04N, Matest.

In the Research laboratory of construction materials, students have the opportunity to perform in-depth tests of various materials and building materials, which can be used for scientific research works and master's theses, as well as for doctoral studies. Equipment available in the laboratory: cameras for testing for permeability and adhesion of wet sealant vapor, humidity exposing chamber, DHR-3 rotary oscillation reometer with the workstation; medium-solid and fragile building materials grinding plant (mill) Pulveeisetete 16, Fritsch GmbH; Automatic mercury porozimeter AutoPore V 9610, Micromeritics with a workstation; Automated particle size and form analyzer with SYNC-Laser Diffraction and Dynamoc Image Analyzer, Microt with the workstation. The equipment allows to work on research and development of new composite building materials.

The equipment in ***the Acoustics laboratory*** is designed for testing the environment and samples of various materials from the acoustic point of view. Available equipment: seismometer set, sound source set, ambient noise measuring set, impact noise generator TM50, noise level detector 2250B-001, ICP microphone sets, 4-channel acoustic measurement analyzer "SOUNDBOOK", complex measurement acoustic tube Tube 60 SET and acoustic measurement tube AcoustiTube 100mm. The laboratory is supplemented with a built-in acoustic measurement laboratory room, where it is possible to perform a large sample for sound insulation and absorption testing and impact sound measurements, but laboratory equipment is supplemented with accessories for AcoustiTube acoustic measuring tube, acoustic camera AC100 in conjunction with data processing software — AcoustiCAM, in addition to microphone sets and various stands and anchorages. Students use the equipment available in the laboratory for the development of scientific research papers, as well as for master's and doctoral studies.

The Building physics laboratory is equipped with temperature and humidity meters and recorders, material humidity level meters, air motion detectors, luxometers and a thermal chamber. All equipment is intended for teaching and scientific work in the field of construction physics. As part of the glass construction study course, a glass impact test stand, glass thickness and coating determiner are available.

Research and training laboratories of Structural Engineering. In recent years, a pressure equipment ALPHA 10-3000 HK-4SH for testing large-scale models and a high-precision fiber-reinforced concrete testing equipment DELTA 5-300 S have been purchased and mastered. The set includes a hydraulic station PA 19-280bar-WKN, control and test control system RS-C30-N-PC with software package PROTEUS. Researchers have a variety of measuring devices at their disposal to measure and digitally record displacements. With a multi-channel strain gauge set consisting of two Quantum MX 440B and MX 1615 B data receivers, it is possible to simultaneously record data from 16 strain gauges and 4 inductive displacement sensors. The universal test device INSTRON (250 kN) has been used for many years to test various materials and building civil engineering models in compression, bending and tension. For the loading of large, relatively full-scale curved structures, a 6.0 m long floor with two movable frames and synchronizable hydraulic Zwick power cylinders and

a pump station with a maximum force of 400 kN is available. All power units are regularly calibrated once a year. The scientific laboratory of building structures is equipped with a bridge crane (40 kN) and the necessary materials and tools. The researchers can use a bar locator Proceq SA with accessories as well as Schmidt's hammer and an ultrasonic device for testing the strength of materials.

The Soil mechanics training laboratory is provided with a load cell for recording the force with a cable for the shear test equipment; natural convection drying cabinet; direct and permanent soil shear test equipment.

The Laboratory of pumps and the hydraulic modeling laboratory perform laboratory work in the study courses Hydraulics, Hydraulic Structures, Pumps and Pumping Stations. The laboratory is equipped with a water flow trough that can be adapted for various laboratory and scientific research works, water flow visualization table, three-stage cascades, shaft drainage and stream models, CAM85/25 water supply machine, as well as a pump stand for pump flow, pump efficiency and various circuit type laboratory works.

Various visual aids are available in **the Water supply and sewerage laboratory**: pump 0.33 kw CTM61-5AC, Oxygen meter (DO-meter), pH meter portable AD 1402, pump BIOX 400-12 Nocchi, oximeter GOX-20, various materials, year of manufacture and types of fittings, pipes and fasteners to be demonstrated to students in supplemented lectures and practical work.

In the study programme, the work with the geographical system (GIS) data is supported by the **GIS Competence Center** established in 2018 within the framework of the Latvian-Lithuanian cross-border cooperation project "Creation of Joint GI Education to Increase Job Opportunities in the Region". The center has 12 workstations equipped with ArcGIS Pro software for studies and research work. Various remote sensing tools are also available under the supervision of the project supervisor. By attracting funding from EU funds, modern, state-of-the-art toolkits have been purchased, such as electronic tachometers, digital levelers, optical theodolites, optical levelers, digital rangefinders, global positioning equipment (single-frequency and dual-frequency), closed engineering search equipment, robotic tachymeter, ground scanner, unmanned aerial vehicle (drone), photogrammetric camera, as well as laths, stands, measuring tapes, reflectors and other materials necessary for the implementation of the surveying study courses. The GIS Competence Center houses a large-format scanner for scanning cartographic images, as well as a plotter and a 3D printer, which students may use in the process of developing scientific and diploma projects.

New measuring instruments were purchased for **the Land surveying training laboratory**, because the existing measuring equipment base of the measuring instruments was worn out and it was necessary to renew it. 7 optical theodolites Fet 500, Geo-Fennel; rotary leveler EL 515 Plus SEt, Geo-fennel; 7 optical theodolites with electronic display Stonex STT 402L; GNSS equipment set Stonex S900A; Stonex S40 with Cube-A software were purchased from the funds of the Faculty of Environment and Civil Engineering.

Computer equipment and software. At the Faculty of Environment and Civil Engineering two computer classes with 49 are available for students in the programme. (25 workstations in room 803, 24 workstations in room 702) for high-performance computers equipped with BIM support software. Several of the computer programs are available on the Academic Data Network (RTU), such as the latest versions of the Autodesk computer programs AutoCAD and Revit, which are used to design architectures and structures by modeling elements in a 3D environment. Computer programs such as Microsoft Project for designing linear schedules of civil engineering works, site management, etc. are also available for work planning, ArcMap and ArcGIS Pro mapping, Mathcad for various mathematical calculations, PHPP building energy audit and passive building design, Trisco & Cobru 86 thermal bridges calculation, Soundplan 7.1 for environmental noise modeling,

Dlubal RFEM and Axis VM for building structure calculations, IDEA StCati Steel for design of metal joint assemblies, Tekla Structures and SEMA for modeling of building structures in 3D environment. The classrooms are equipped with interactive displays and whiteboards, which provide an opportunity for teachers to explain the study material and tasks with versatile and interactive methods, but for students - to present their study works.

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Provision of financing

The **number of state-funded study places** is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for **Bachelor's programmes is 1** and the social funding of one study place for Bachelor's programmes is 164.34 EUR, the study cost **coefficient for the Bachelor's programme "Civil Engineering" is 1.7** (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"), costs per student in the Bachelor's programme "Civil Engineering" amount to 2935.52 EUR. In 2021, the **tuition fee** in the study program is 1100 EUR per semester, or 2200 EUR per year for full time studies and 700 EUR per semester, or 1400 EUR per year for part time studies.

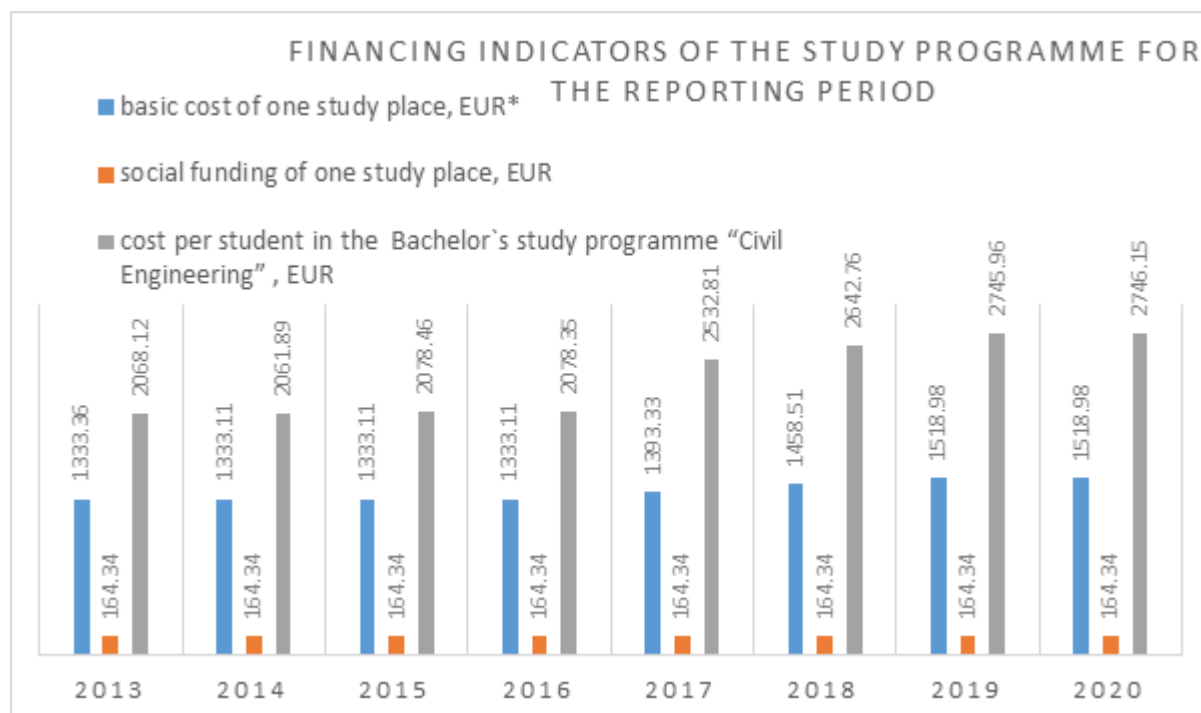


Figure 4 State funding per study place in the bachelor study programme "Civil Engineering"

* Cost per student slightly differ at the same basic data (the basic cost of one study place and the social funding of one study place) in 2014, 2015 and 2016, and 2019 and 2020, because every year the provision of the study coefficient is provided in % with some decimals and may be slightly different. Rounding up, this provision is 100%, but, in figures in the contract in 2020 it was - 99.98242%, in 2019 - 99.97517%. Similar situation was in 2016, 2015 and 2014, when the provision was 85%, but in figures in the contract in 2016 - 84.45564%, in 2015 - 84.46058%, in 2014 - 83.7295803%

Financial support has increased during the reporting period, but so have expenditures, the

minimum wage rate and other economic indicators. Paid students do not cover the state-paid budget places, because tuition fees for similar study programmes in the field of education in Latvia are not yet close to the state funding, so it would not be competitive to determine it this way, but the paid places of the study programme includes only students with study debts, except for the first year, when there are more students enrolled than there are budget places available.

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

In 2020, the share of **costs of the Bachelor's study program "Civil Engineering"** consisted of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Additional financial support opportunities for students in the programme

State scholarships in the academic Bachelor's study programme until 1 January, 2020 were 99.60 EUR, but for the period from 01.01.2020 until 31.12.2021, the scholarships are intended to reach 200 EUR per month. In one study year, scholarships are awarded to an average of 13 students, according to the number of successful students, the scholarships are distributed in proportion to the students of each study year who have received the highest grades. Students in the programme also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU (Senate, Jāņa Čakstes, Kārļa Ulmaņa etc.), as well as special scholarships for the field (the scholarship of SIA PERI), the scholarship of A.Tramdahs of the Faculty of Environment and Civil Engineering. Such scholarships have been received by 4 students of the programme during the reporting period.

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 total number of lecturers involved in the professional higher education Bachelor's study programme "Civil Engineering" has not changed much. The gradual attraction of new teaching staff for the implementation of the study process is to be positively assessed. The total number of lecturers is 51 (36 - from the Faculty of Environment and Civil Engineering, 15 - from other faculties of LLU) (Table 3). 39% of the academic staff are elected in academic or research positions, 12 of the teaching staff have been promoted, 9 lecturers have terminated their employment relationship to change their position, some have retired and some have passed away, 8 new lecturers have started employment relationships.

Some of the lecturers who teach specialization study courses, in addition to working at the university, also work in production companies. This means that students receive up-to-date information about production processes and this improves the acquisition of theoretical knowledge. As this is a professional study programme, the connection of the teaching staff with production promotes the selection of realistic course project and final project topics.

Table 3

Number of academic staff involved in the first level professional higher education study programme Civil Engineering

Position	2013/2014 study year		2020/2021 study year	
	Number	%	Number	%
Professors	5	8	4	8
Associated professors, incl. Emeritus	7	11	9	17
Assistant professors	7	11	10	20
Lecturers	34	55	28	55
Assistants	9	15	-	0

Total number	62	100	51	100
Incl. Leading researchers			13	
Incl. Researchers			2	
Incl. research assistants			2	

During the reporting period, a total of **5 lecturers** were involved in the implementation of the 2nd level professional higher education study programme Civil Engineering, who **are also doctoral students of LLU doctoral study programme Civil Engineering**. Thus, the replacement of academic and scientific staff in the field of civil engineering is gradually being formed. Doctoral students are also closely involved in research and development of innovative solutions in the field of building civil engineering and development of new composite materials from local biomaterials and their properties (acoustics, fire safety and other properties), which allows to integrate the acquired knowledge into study courses and pass it on to future specialists.

During the reporting period, **foreign guest lecturers**, as well as **guest lecturers from the industry** were attracted as much as possible. Involving guest lecturers in the study process is very important, because often guest lecturers introduce students and lecturers to a very specific or narrow topic, which cannot be included in the study programme plan, but which provides important additional information. It is also important to learn about foreign experience, showing what is relevant in the field at the international level. Attraction foreign and local guest lecturers is not paid from the state funding for the study program, therefore external funding sources are required. A positive experience is the possible mobility of foreign guest lecturers to the LLU under THE ERASMUS + programme, an example of two foreign guest lecturers from Ostrava Technical University in the Czech Republic who were lecturers in the field of building structures. Within the framework of the project "Improvement of LLU academic staff" (No. 8.2.2.0/18/A/014) implemented by LLU in the study year 2019/2020, a professor from the Estonian University of Life Sciences has been attracted to an employment contract at the Department of Building Structures. The Faculty of Environment and Civil Engineering attracts foreign guest lecturers every year from the faculty's own earned funds (tuition fees) in the fields represented by the faculty. Thus, in the 2017/2018 academic year, a professor from the University of Maribor in Slovenia was attracted to an employment contract. The professor gave valuable lectures and consultations to students in the field of building structures. Guest lectures are also given by foreign lecturers doing traineeships at LLU. For example, in the 2017/2018 academic year, guest lectures in civil engineering programmes were also given by a lecturer from the Wrocław University of Environmental and Life Sciences in Poland.

Every year, **in cooperation with companies and graduates, guest lectures are organized** for students in the programme. Specialists mainly introduce the latest technologies in production, modern wooden, steel and reinforced concrete structures, technological processes in agricultural buildings, the provision of traineeships and jobs. During the reporting period, the average number of guest lectures in the program is 20-30.

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 programme **fully complies with the conditions of the study programme implementation and the requirements of the regulatory enactments** (Table 4). Regular professional development of the teaching staff helps to achieve the study results.

Table 4

The conformity of qualification of the teaching staff with the requirements of the regulatory enactments

Requirements	Compliance
The qualification of the academic staff involved in the implementation of the study programme complies with the requirements of the Law on Higher Education Institutions regarding the implementation of study programmes in a university-type higher education institutions. The provision set forth in Section 39 of the Law on Higher Education Institutions - <i>"Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught."</i>	has been ensured
The knowledge of the state language of the teaching staff involved in the implementation of the study programme complies with the regulations regarding the scope of knowledge of the state language and the procedure for testing the state language proficiency for the performance of professional and official duties.	has been ensured
The English language skills of the teaching staff involved in the implementation of study programmes taught in English correspond to at least Level B2 (<i>Section 55 of the Law on Higher Education Institutions</i>).	has been ensured
Each member of the academic staff has published articles in peer-reviewed publications , including international publications, in the last six years (in case of a shorter period worked, the number of publications is proportional to the time worked) or creative artistic achievements (such as exhibitions, films, theater performances and concerts), or five years of practical work (except length of service in the implementation of the study programme) in accordance with the Law on Higher Education Institutions	has been ensured

Of the 51 teaching staff members involved in the study program, 22 are with Dr. degree, which makes up 43% of the total number, the rest have a master's degree, a large part of which are either **currently studying for a doctorate** or have temporarily stopped doctoral studies, but are continuing their research work. Very small number lecturers with bachelor degree are involved in the implementation of the study programme. They are usually specialists from the industry

34 lecturers work in specialized civil engineering departments, and almost all of them also work in professional civil engineering organizations, where they perform mainly the functions of a designer, civil engineering organizer, construction supervisor, expert or technical supervisor. 10 lecturers have qualification certificates in the respective fields. Assessing the groups of study courses separately, the building civil engineering course unit has 5 lecturers with a doctoral degree and 7 with a Master's degree; the building physics and architecture unit has 2 Doctors and 10 Masters; construction organization and management, as well as the technology unit has 3 Doctors and 4 Masters; BIM study courses are taught by a lecturer with a specialized Master's degree in BIM.

Within the framework of professional development, the teaching staff participates in the following activities

- **ERASMUS + mobility** to foreign universities and research institutions;
- **professional development courses and seminars with training**, including university didactics courses;
- **conferences and seminars as listeners;**
- **exhibitions as visitors;**
- **maintained professional certificates;**
- **traineeship in companies** ESF project no. 8.2.2.0/18/A/014 "Development of academic staff".

5.tabula

Participation of the academic staff of the programme in activities of professional development

Sudy year	Professional development courses (incl. English)	Conferences, seminars	Exhibitions	Other (traineeship in companies, professional certificates)
2014/2015	9	22	4	8
2015/2016	8	13	4	8
2016/2017	9	23	6	5
2017/2018	7	15	12	9
2018/2019	13	17	13	10
2019/2020	19	7	2	8
Total number	65	97	41	53

The lecturers involved in the implementation of the study programme regularly raise their professional qualification. At least once every six years, the lecturers attend the professional development programme for higher education lecturers **“Innovations in Higher Education Didactics”** (160 h). During the reporting period, 10 lecturers completed the professional development programme for lecturers and obtained a certificate.

During the reporting period, 8 lecturers improved their qualification **in English language courses**. Teachers also improve their English language skills by going on ERASMUS + mobility to partner universities abroad and participating in international conferences, cooperating with international partners within the framework of various research projects, for example:

- Wrocław University of Environmental and Life Sciences in Poland conducting guest lectures, workshops, consultations, reviewing scientific articles
- The University of Trás-os-Montes e Alto Douro (UTAD) in Portugal and Wrocław University of Environmental and Life Sciences in Poland, LLU Civil Engineering study programme in organizing the international scientific conference ICOSADOS and reviewing scientific articles, as well as organizing and conducting a student summer school. International Summer School of Building Engineering Students
- For European project Week EPWorganizers - the Engineering College of Copenhagen in Denmark, Edinburgh Napier University in Scotland, Lyon Technical University (IUT A Université Claude Bernard, Lyon) in France, Amsterdam University of Applied Sciences in the Netherlands, University of Burgos in Spain.
- Aleksandras Stulginskis University in reviewing scientific articles.
- University of Maribor in guest professorship, guest lectures, organization of seminars, review of scientific articles
- etc.

During the reporting period, in addition to the opportunities for professional development offered by LLU, teachers have actively attended other institutions, such as the Zemgale Region Competence Development Center, DVS Namejs User Support Center, Latvian Association of Civil Engineers and **other organized professional development courses**. The main topics of the courses and seminars are related to the latest regulatory framework in civil engineering, innovations and technical solutions, green and sustainable building, digital skills. Within the framework of the LLU implemented project “Development of the LLU academic staff” the teaching staff had the opportunity to do **traineeships in the companies** of the branch. The teaching staff increases their qualification by participating in the **Academic Conference of the LLU**, where topics relevant to the implementation of the study process are considered.

In addition, **teaching staff are active in a variety of industry organizations, associations and networks, including international organizations** such as International Association for Bridge and Structural Engineering (IABSE); Green Economics Institute England, Oxford (GEI); Nordic Association of Agricultural Scientists (NJF); The European Intellectual Property Teachers’ Network (EIPNTN); International E-learning Association (IELA); German Institute for Construction Technology (Deutsches Institut für Bautechnik); Azerbaijan State Agency for Control over Construction Safety of the Ministry of Emergency Situations.

The qualification of the teaching staff complies with the conditions of the study programme implementation and the requirements of regulatory enactments. This is evidenced by the demand for them to **read guest lectures/ participate in seminars for industry specialists**. Lectures are given in companies engaged in raising the quality of certified civil engineers, for example, SIA CMB Inženieru kompetences centrs; SIA LBS konsultants; A/S UPB etc. Topics covered are related to building structure calculations, building project expert inspections; division of responsibilities in the

civil engineering process; building acoustics, the most common discrepancies and frequently unresolved issues. Practical classes in Automation of calculations of reinforced concrete structures, Design of composite building structures in accordance with Eurocode 4, Estimation and construction of wooden structures in accordance with Eurocode 5, Estimation and construction of wooden building structures I: Beams and panels of wood materials, Estimation and construction of wooden constructions II: Design of wooden floor trusses, Estimation and construction of wooden constructions III: Wooden frames, columns, arches .

The teaching staff is highly valued and has received various levels of awards at the level of state and professional institutions. The Ministry of Agriculture Award “For Diligence”; The Honorary Mention of the Ministry of Agriculture; 4 teachers have received the Grand Prize of the Construction Industry for Lifetime Achievement. There are awards Civil engineer of the Year, the Mentor of the Year.

The qualification of the teaching staff fully complies with the conditions of the study programme implementation and the requirements of the regulatory enactments. Regular professional development of the teaching staff helps to achieve the study results. The scientific and professional qualification of the academic staff and its improvement help to achieve the intended learning outcomes, especially in professional study programmes, because students acquire not only theoretical but also professional knowledge, since study trips are organized to construction sites, which can have better quality if academic staff members are involved and actively work in the industry. Academic staff members attend seminars of professional development, follow the latest developments in the construction industry, manage traineeships, assist to provide placement for traineeship. Students highly value the advice of professionals, especially in developing course projects and final theses under the guidance of professionals. Teachers often help students with recommendations for jobs after graduation.

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.

According to the Senate Decision No. 10 – 70 of 11.03.2020 the academic work of LLU includes not only the pedagogical work, but also research and work on ensuring quality of the study process. **Each year the academic staff, leading researchers, researchers and scientific assistants provide information on their scientific activities and receive an assessment according to the effective criteria set by LLU Science Council.**

Research activities of the academic staff of the programme are in close relation with the priority research directions in the area of civil engineering set out in the LLU Development Strategy 2015 - 2022 (<https://www.llu.lv/index.php/en/mission-and-vision>): *Sustainable construction, development of new, innovative building materials and studies of their properties; Safety of building structures and their operation under sustained loading.*

In accordance with these research directions, the academic staff of the study programme implement the following activities, also involving students of the programme:

- European Union funded research projects;
- Contract research with construction companies;
- LLU internal research projects;
- Research projects.

Undergraduate, master's and doctoral students of civil engineering study programmes are often involved in the implementation of projects to use obtained results from the projects in their research work in study programme.

Safety of building structures and their operation under sustained loading.

The academic staff of the Department of Structural Engineering of VBF, doctoral students, master students, as well as in some researches also undergraduate students are involved in the implementation of their research. Experimental and theoretical research has been carried out, the results of which have been useful for civil engineering companies, and are reflected in reports at conferences, publications and master's theses, as well as in future doctoral theses.

The research work of the academic staff in the projects has facilitated not only the acquisition of **new knowledge and its inclusion in the content of the study program**, but also **the development of laboratories**, attracting funding for the purchase of new equipment and facilities. For example, ERDF project *“Efficiency of fibre reinforced cement composites in structural walls”* (No.1.1.1.2/VIAA/3/19/487) of the programme “Growth and employment” 1.1.1 support objective “To increase the research and innovative capacity of Latvian scientific institutions and their capability to attract external funding, investing in human resources and infrastructure”. Already before the particular project there have been significant research activities implemented during the research contracts with companies from the industry. For example, research contract *“Loading tests of concrete manholes and inspection chambers in accordance with the standard LVS EN 1917”* (SIA Guno M, SIA PRIORITET, AS SMILTENIEKI etc.), experimental studies on *the mechanical strength of concrete construction products* (SIA Inspecta Latvija), experimental studies on *shear capacity of bolted joints* (SIA CMB, SIA “Empower”, SIA UPPE), research contract *“Fibre reinforced concrete prisms: production and measuring the flexural tensile strength in accordance with the standard LVS EN 14651”* (SIA PICHE), experimental studies on *load bearing capacity of precast concrete slab-wall connection* (SIA UPB) etc. Within the mentioned above project the

scientific article "Load Bearing Capacity of Precast Concrete Slab-Wall Connection" was developed (indexed in Scopus data base). After the completion of the project a new research contract was concluded with the company AS UPB (Nr. 3.2.2.-9/28), resulting in attraction of new doctoral student for studies in the PhD study programme Civil Engineering at LLU in 2021. Within the framework of his doctoral thesis student is working on the topic of precast concrete slab-wall connections. The doctoral student is also a lecturer of the program. Within the cooperation between the companies from the industry, as well as by attracting ES funds within the project "*Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision.*" (Nr. 1.1.1.4./17/I/003) implemented by LLU, **significantly developed Scientific Laboratory of Structural Engineering**. It allows to implement research activities of various scales and complexity on safety of building structures and their operation under sustained loading, as well as to supervise research of doctoral students, for example within the framework of LLU internal grants. One of projects is "*Analysis of the effect of graphene and steel short fibers on the stiffness of reinforced concrete structures*" Z49 (01.06.2020. – 31.05.2022.) of the LLU programme "Strengthening of scientific capacity at LLU".

The findings and results obtained in these studies are also included in the content of several study courses, for example, *Special Building Structures, Reinforced Concrete and Masonry Structures, Scientific Work in Specialty, Principles of Scientific Work*.

Within the theme of **concrete construction products**, in cooperation with industry companies, innovative solutions are also being worked on, such as **3D printing technology** and process research (TEP79) (SIA "3D Tech"). Similar cooperation is formed within other research topics in this field, for example, by implementing contract research in **the field of wooden constructions** - Expertise of wooden constructions of the Ministry of Education and Science (No. 3.2-10 / TPK-16) (SIA "CMB"), as well as conducting doctoral research within the framework of LLU internal grants - project "*Methodology for determining the torsional stiffness modules of moment connection of wooden elements* Z37 (03.06.2019 - 31.05.2021).

The findings and results obtained in these studies are also included in the content of several study courses, for example, *Special Building Structures, Wooden and Plastic Structures, Scientific Work in Specialty, Principles of Scientific Work*.

Sustainable building, development of new, innovative building materials and research of their properties.

Lecturers of the Department of Architecture and Building of VBF, doctoral students, master students, as well as in some researches also undergraduate students are involved in the implementation of their research. Experimental and theoretical research has been carried out, the results of which have been useful for civil engineering companies, and are reflected in reports at conferences, publications and master's theses, as well as in future doctoral theses.

One of the topics of the direction is **the development of innovative building materials from local biomaterials**. Under this theme, the academic staff of the program was involved in ERDF projects "*Development of new composite materiāls om foam gypsum bases with fibrous reinforcement and their systems*" (No. 2010/0320/2DP/2.1.1.1.0/10/APIA/VIAA/107) (01.01.2011-31.12.2013) and "*Innovative technology for complex processing of fiber plant residues into products with high added value*" (No. 2013/0044/1DP/1.1.1.2.0/13/APIA/VIAA/022) (22.01.2020.-31.01.2020.). Within the framework of this topic, the research of doctoral students within the framework of LLU internal grants "*Biocomposite Materials for the Building Wall Constructions*" (Z19) is also led.

The development of innovative building materials from local biomaterials is also linked to **the**

theme of sustainable building. Within the framework of this topic, doctoral students' research within LLU internal grants is led - project "Research and development of innovative low or zero heat eco-building construction technologies" (G5), project " Development of innovative technologies and their research of concentration and efficient use solar thermal energy in passive and active systems for build up energy efficient buildings" (G9).

The equipment of the scientific laboratory of building materials also allows to perform research on the physical properties of various **composite building materials**. In co-operation with industry companies, an industrial study was carried out - testing of samples in accordance with the standard "LVS EN 12467+A2:2018 "Fiber - cement flat sheets - Product specification and test methods" (7.4 Tests for climatic performance; Requirement 5.5.2 Freeze-thaw for Categories A, B and D; Assessment method 7.4.1 Freeze-thaw; Compliance criteria 5.5.2 Freeze-thaw for Categories A, B and D and 7.4.1.4 Expression and interpretation of results)" (SIA "Skonto Concrete Cladding").

By attracting European Union funding, the project "Strengthening the research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions" (No. 1.1.1.4./17/I/003) implemented by LLU has **created a unique Acoustics Laboratory**, which allows to study sound absorption in large-scale construction products before they become part of the building. In the field of acoustics, the academic staff of the programme has been working on the analysis of experimental samples in the industrial study "Determination of the sound absorption coefficient of four experimental samples in an impedance tube".

The findings and results obtained in these studies are also included in the content of several study courses, for example, *Building Materials, Principles of Scientific Work, Diploma project*.

The academic staff of the programme regularly publishes the results of research work in scientific journals, as well as has presented reports at international scientific conferences. For example:

- International Conference on Safety and Durability of Structures, in Wroclaw (2014), Porto (2016), Jelgava (2018);
- International Association for Bridge and Structural Engineering – IABSE in Madrid (2014), Vancouver (2017), Christchurch (2020-21 online)
- 1st Pan American Congress on Computational Mechanics- PANACM 2015 in Buenos Aires in 2015
- International Conference on Chemical & process Engineering in Milan (2014, 2015)
- International Structural Engineering and Construction Conference ISEC in Honolulu (2013), Istanbul (2016), Chicago (2019);
- World Multidisciplinary Civil Engineering - Architecture - Urban Planning Symposium in Prague (2018) etc.

The academic staff also participates in international professional and scientific organizations and working groups, which allows to identify current issues in the field and the experience of foreign partners in the implementation of research. The academic staff of the programme works in organizations such as the International Association for Bridge and Structural Engineering (IABSE); Green Economics Institute England, Oxford (GEI); Nordic Association of Agricultural Scientists (NJF); The European Intellectual Property Teachers' Network (EIPTN); International E-learning Association (IELA); German Institute for Construction Technology (Deutsches Institut fur Bautechnik); Azerbaijan State Agency for Control over Construction Safety of the Ministry of Emergency Situations.

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).

Due to the main common goal of the study programme: to prepare good building civil engineers for national needs, **the cooperation of the teaching staff within the programme is very close.** Given that the topics of the study courses are planned to be continuous, it means that each study course is based on the knowledge and skills acquired in the previous courses; thus, the teaching staff must cooperate to improve the quality of work. In order to promote cooperation, ensure the interconnection of study courses, on the basis of BIM, it is planned to develop residential and industrial building projects including architectural aspects, engineering communications, construction structures and aspects of construction work organization. This co-operation at the faculty level starts with the first year and continues until the final work.

The teaching staff of the civil engineering specialization within the study programme also **cooperates with the teaching staff of other LLU faculties.** For example, when learning the energy efficiency calculations of buildings both within the course projects and research works, the teaching staff cooperates with the teaching staff of the Department of Physics, using the laboratory equipment of the department and special computer programs. When working on the development and practical application of new building materials based on local biomaterials, the teaching staff of the civil engineering study programme cooperates with the teaching staff of the Faculty of Agriculture. Cooperation with the Forest Faculty takes place in several directions: a combustion chamber located in the Department of Wood Processing is used for the practical training of building fire safety courses. The teaching staff from the same department solves the problems of using wooden constructions.

There is cooperation with the teaching staff of the Faculty of Agriculture and Engineering in acquiring the study course of construction of agricultural buildings. Acquiring economic study courses, there is cooperation with the Faculty of Economics and Social Development, as well as other LLU faculties. Cooperation takes place also **in organizing scientific and practical conferences and seminars.**

The academic staff of the programme **cooperate at the national, professional and university levels.** Members of the teaching staff are experts of the Latvia Science Council (LZP), full and honorary members of the Latvia Agriculture and Forest Science Academy (LLMZA), were experts in evaluation and accreditation of several study programmes in cooperation of the Ministry of Education and Academic Information Centre. The academic staff of the programme are involved in Evaluation Committees of diploma projects and qualification works at Riga Technical university and Riga Building College, as well as in editorial boards and scientific committees, for example, magazine of the building sector "Civil Engineer" (Būvinženieris), international scientific conference ICOSADOS, international scientific conference "Students on their Way to Science", etc. Also, cooperation takes place with professional organizations of the building industry and education organizations, for example, Association of Professors of Latvia Higher Education Institutions, Latvia Council of Economists, Latvia Association of Civil Engineers etc. Within the framework of cooperation members of the academic staff have participated as members of awarding committees in different competitions of the building sector, for example, Grand Prize of the Construction Industry (2015-2021) , Building of the Year in Latvia (2015-2021), etc.

The teaching staff actively **cooperates with companies from the building industry** by organizing field trips for students with guest lecturers from companies, as well as conducting seminars in companies themselves. Several **lecturers give guest lectures in courses** organized by the Latvian Association of Civil Engineers, SIA CMB etc.

The academic staff in **cooperation with the Building Design Construction Council** organize traveling exhibitions in the premises of LLU Faculty of Environment and Civil Engineering and participate in **other popularization events of the construction industry**:

- Annual traveling exhibitions, such as "Places Changed by Buildings" (2019, 2020, 2021).
- Participation in the conference "Challenges in industrial civil engineering and solutions" (2019).
- Annual campaign "Learn Civil Engineering" - guest lectures, field seminars, study tours, traveling exhibitions for popularization of the specialization of civil engineering among young people (2018, 2019, 2020, 2021) (<https://www.buvniekupadome.lv/izglitiba/> (in Latvian)).

The **ratio between the number of students and the teaching staff** of the professional bachelor study programme Civil Engineering programme is 13.4 (on 01.09.2020.), overall in LLU it was 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	1_appendix_students_statistical_data_ENG.pdf	1_piel_statistikas_dati_studejosie_LV.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	2_appendix_compl_with_education_standard.pdf	2_piel_atbilstiba_valsts_izglitiba_standartam.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable)	3_appendix_conf_with_prof_standard.pdf	3_piel_salidzinajums_ar_profesijas_standartu.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	7_appendix_study_course_mapping_ENG.pdf	7_piel_studiju_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	4_appendix_study_plans.rar	4_piel_studiju_plani.rar
Descriptions of the study courses/ modules	5_appendix_study_courses_description_FT_PT.rar	5_pielikums_studiju_kursu_apraksti_PL_NL.rar
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	BUV_BAK_ENG.pdf	BUV_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	agreement_RTU_LLU.rar	vienosanas_RTU_LLU.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_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.		

Landscape Architecture (51581)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Landscape Architecture</i>
Education classification code	<i>51581</i>
Type of the study programme	<i>Doctoral study programme</i>
Name of the study programme director	<i>Aija</i>
Surname of the study programme director	<i>Ziemeļniece</i>
E-mail of the study programme director	<i>aija.ziemeļniece@llu.lv</i>
Title of the study programme director	<i>Dr.arch.</i>
Phone of the study programme director	
Goal of the study programme	<i>The objective of the doctoral study programme Landscape Architecture is to prepare highly qualified scientific specialists in the field of Landscape Architecture in accordance with international standards, providing doctoral students with high-level theoretical studies necessary for the development of a qualitative doctoral thesis and for obtaining a degree, as well as independent research, approbation and pedagogical work.</i>
Tasks of the study programme	<ul style="list-style-type: none"> <i>• To train scientists and teachers in the field of Landscape Architecture, in accordance with international standards in the field;</i> <i>• to provide students with an opportunity to acquire higher level theoretical study courses that promote the ability of doctoral students to conduct research independently or in a team;</i> <i>• to ensure the acquisition of pedagogical practice by involving them in bachelor's and master's level study courses;</i> <i>• to promote the publication of doctoral research results in high-level international scientific publications, as well as to independently prepare scientific publications both in the field of landscape architecture and in interdisciplinary topics;</i> <i>• to provide students with the defense of the doctoral thesis in the branch promotion council, in accordance with the effective regulatory enactments.</i>

Results of the study programme	<p>Knowledge:</p> <ul style="list-style-type: none"> • on current scientific theories and findings in landscape architecture and their connection with other fields of science; • and a high level of understanding of research methodology and modern research methods in landscape architecture. <p>Skills:</p> <ul style="list-style-type: none"> • to independently evaluate and choose internationally recognized research methods appropriate to scientific research; • to apply their research skills when conducting research in a field of which they are part at the level of internationally cited publications; • to present and prepare reports at international scientific conferences on the topical issues of their research and research in the field of landscape architecture; • to implement scientific projects independently or in a team, accomplishing achievements at the international level; • to solve research problems and provide knowledge independently or in a team, in accordance with the current issues of landscape architecture science and interdisciplinary research; • to independently prepare and present study materials in the field of landscape architecture. <p>Competencies:</p> <ul style="list-style-type: none"> • to independently solve significant research or innovation tasks in the field of landscape architecture; • to formulate independently the research problem, hypothesis or basic research question, create a research plan, work on data collection and analysis, formulate research results and conclusions; • to convincingly demonstrate their abilities and knowledge in the implementation of scientific projects or research and in the development of new projects or research ideas.
Final examination upon the completion of the study programme	Developed 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 or equivalent higher education in the field of landscape architecture, architecture, urban planning or spatial planning.
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 Arts, Music and Architecture

Qualification to be obtained (in english)	-
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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	<i>Full time studies</i>
Duration in full years	3
Duration in month	0
Language	<i>english</i>
Amount (CP)	120
Admission requirements (in English)	<i>Master's degree or equivalent higher education in the field of landscape architecture, architecture, urban planning or spatial planning. The English language knowledge at least at B2 level for foreign applicants.</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Doctoral degree Doctor of Science (Ph.D.) in Arts, Music and Architecture</i>
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 degree to be awarded has changed during the reporting period. After the successful defense of the dissertation in the period until 2019 the applicant was awarded the degree of Doctor of Architecture (Dr.arch.) in Landscape Architecture sub-branch. Starting from 1.01.2020, the degree awarded is a Doctor of Science (Ph. D.) in the sub-discipline, which is determined by the Cabinet Regulation No. 49 of 2018 "Regulations on Latvian Science Disciplines and Sub-Disciplines". The changes are determined by the amendments of 2018 and 2020 to the Cabinet Regulation No.1001 "Procedures and Criteria for Awarding a Doctoral Degree (Promotion)" which provides for the changes in the title of the scientific degree to be awarded also in the already existing doctoral study programs. They are also determined by the classification of Latvian science disciplines and sub-disciplines approved in 2018 (Cabinet Regulation No. 49), which differs from the classification applicable in the previous period.

Further in accordance with the Study Quality Commission of the Academic Information Center 2020. On March 13, the applicant is awarded a *Doctor of Science (Ph.D.) in Arts, Music and Architecture*.

The new classification of Latvian science branches and sub-branches approved in 2018, as well as the growing relevance of interdisciplinary research in recent years has also initiated changes in **the admission rules of the programme**, expanding the opportunity for doctoral students to study in Landscape Architecture. Previously, admission requirements were set for a master's degree in Architecture, which is now extended to a *Master's degree or equivalent higher education in the field of landscape architecture, architecture, urban planning or spatial planning*.

Also, taking into account the interest of international students in doctoral studies in the doctoral study programme in Landscape Architecture at LLU, thus, further **the programme will be implemented in English**. Therefore, **the admission rules of the programme** additionally include *the English language knowledge at least at B2 level for foreign applicants*.

Other parameters of the study programme have not changed since the last accreditation.

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 reporting period, students of the Doctoral Study Program in Landscape Architecture have **studied only in state-funded study places**, which are awarded 4-6 every year. This number generally corresponds to the market demand for specialists with a doctoral degree in

Landscape Architecture (for work in landscape research, academic positions in Landscape Architecture study programs, which are implemented only at LLU). As the majority of doctoral students already work in the field, the interest in doctoral studies is mainly related either to the desire to be more actively involved in academic and research work or to the improvement of knowledge. The periods most often chosen to improve one's knowledge coincide with the deterioration of the economic situation in the country and, consequently, the decline in the volume of work in the construction sector. This in turn creates an opportunity to focus more on improving their knowledge, skills and competences. On the other hand, as the economic situation in the country improves and the amount of work in the sector increases, there is an increase in the number of students who choose to take an academic year or even temporarily stop their studies, as it is possible to work more actively as practitioners in Landscape Architecture or Architecture.

Given the interdisciplinary nature of landscape research, graduates of other higher education institutions, for example from the fields of Architecture and Environmental Sciences, are also increasingly interested in studies in the doctoral study program Landscape Architecture. It also highlighted the need to review the conditions of admission to the programme, extending them to students from fields related to Landscape Architecture (Architecture, Environmental Sciences, Geography, etc.).

In total, about 70% of students successfully complete the study programme, but 50% defend their doctoral thesis and obtain a doctoral degree. **During the reporting period, 9 graduates of the programme obtained a doctoral degree**, which is a good indicator in the Latvian context, which also meets the demand of the industry. Almost all students (85%) use the opportunity to apply for the academic leave of absence, because during the studies it is not always possible to complete their research. Also, about 50% of students postpone the completion and defense of the doctoral thesis even after successful completion of studies. Until now, the main reason for using the academic leave of absence, dropping out of studies or postponing the defense of a doctoral thesis has been insufficient or only fragmentary funding available for research in various projects and contracts.

Dynamics of students by academic and study years, as well as number of defended PhD Theses are shown in *Figure 1*.

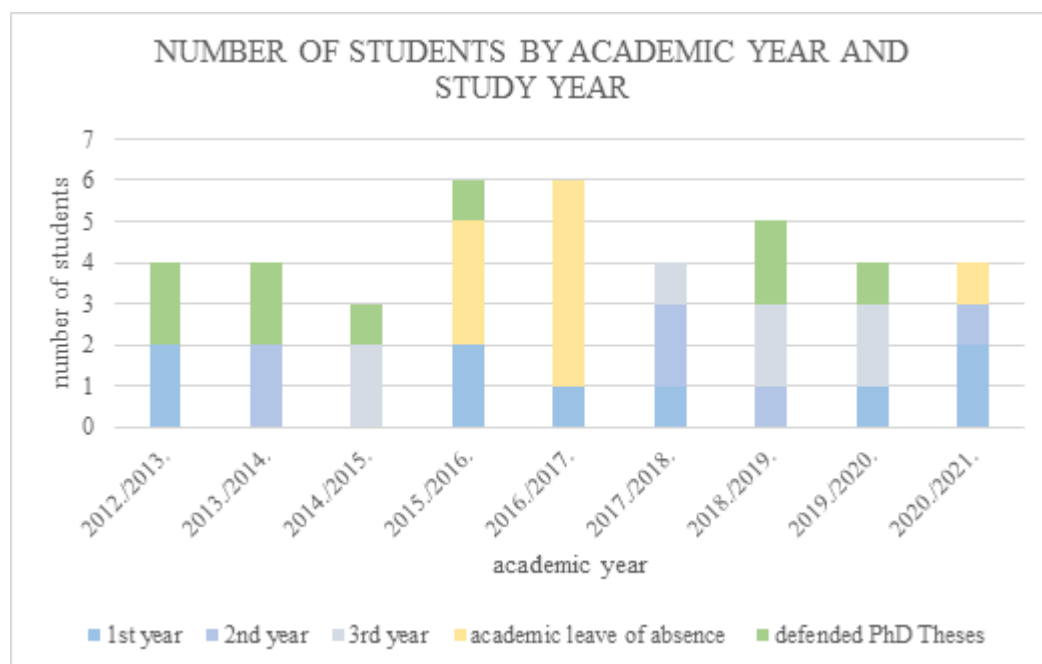


Fig.1 Number of doctoral students by study and academic year, number of defended PhD Theses (2013-2021)

Support opportunities for research development, publication of results and presentation at conferences are important for defending a successful doctoral thesis. This is also proved by the ESF co-financed project "Support for the implementation of doctoral studies at LLU" implemented by LLU until 2015 (No. 2009/0180/1DP/1.1.2.1.2/09/IPIA/VIAA/017), within the framework of which doctoral students were awarded grants in the form of a monthly scholarship, as well as research development and publicity of results. 7 doctoral students of the doctoral study program Landscape Architecture (including 5 in the reporting period) also received this grant and successfully defended their doctoral theses, 4 of them continue their work as lecturers and researchers at the Department of Landscape Architecture and Planning. After 2015, at the end of the ESF project, a decrease in the number of students is visible. Statistical data on students of the PhD study programme "Landscape Architecture" are available in *Appendix No.1*

In addition to financial support for full-fledged research, doctoral students work elsewhere in parallel with their studies to provide a livelihood. In such a situation, there is a lack of time and money for qualitative research, which does not allow to fully develop research within the doctoral studies and defend the doctoral thesis within two years after graduation. Aware of the above situation and in order to motivate doctoral students to get more involved in studies and research work, which would allow to develop research qualitatively and defend doctoral theses during the studies, **LLU has been working on support programs for doctoral students** for the last two years. They give the opportunity to devote more time to their research and development of the doctoral thesis. For example, LLU programmes "Strengthening Scientific Capacity of LLU" and "Carrying out Fundamental Research at LLU" provide the opportunity to apply for funding for research, as well as to ensure publicity in international conferences. These support tools have also been used by 2 students in the doctoral program in Landscape Architecture.

Also, in order to promote further involvement of doctoral students and scientific degree applicants in research and academic work at LLU, and at the same time increase the number of LLU academic staff with doctoral degrees and form succession in the scientific directions implemented at the university, in the framework of the project "Improvement of the LLU Academic Staff" (No. 8.2.2.0/18/A/014), in the academic year of 2019/2020, one doctoral student of the Landscape Architecture doctoral programme was involved in the academic work. During the project, the doctoral student defended his doctoral thesis and was elected to the position of assistant professor. Thus, after the implementation of the project activity, the new doctor continues to work at LLU as an elected lecturer and leading researcher at the Department of Landscape Architecture and Planning, supplementing the lecturer with the number of scientific degrees at LLU.

Also, by 2020 **to 2026, the university aims to create a new model for the development of doctoral study programmes in the fields of strategic specialization of the LLU**, therefore in 2020 the LLU **Doctoral School** was established. The new approach will offer a different funding model for doctoral students and a greater connection with the already more strongly developed research directions at LLU, where active work is also taking place within the framework of various research projects. Thus, these directions will be strengthened by reducing the fragmentation of research, creating succession and visibility. The new model will also focus on the involvement of doctoral students and doctoral degree holders in the academic and research work of the LLU, promoting the development and succession of academic staff. Already starting **from 2021, a new support program has been launched, which allows doctoral students to apply for a grant for research** within the project "LLU transition to the new doctoral funding model" (No. 8.2.2.0/20/I/001).

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 doctoral study program Landscape Architecture is the final stage in Landscape Architecture education, which follows successful bachelor's and master's studies. Consequently, this succession is also marked in **the title of the study programme**, as well as coincides with the classification of science branches and sub-branches approved in Latvia (Cabinet Regulation No. 49 of 23 January 2018), in which Landscape Architecture is defined as one of the sub-branches. **LLU is the only higher education institution in Latvia that has been implementing education programmes at all levels (bachelor's, master's and doctoral) in the field of Landscape Architecture for more than 25 years.** Landscape architecture education at LLU was established and developed simultaneously with the whole branch in Latvia, which is also confirmed by the close, more than 25-year cooperation with the Latvian Association of Landscape Architects (formerly the Latvian Society of Landscape Architecture). Thus, LLU is being established as an education and research center in the field of Landscape Architecture, because together with doctoral studies and the growth of new doctors of sciences significant research projects in the field of landscape research are implemented (for example, the Latvia State research programme project "Sustainable land resource and landscape management: challenges, development scenarios and proposal"(LandLat4Pol), which envisages the creation of a digital Latvian landscape atlas).

In recent years, in line with new initiatives that include both **interdisciplinarity** and **sustainable development**, as well as the role of **public participation** in various decision-making processes, the range of issues to be researched and addressed in the field of Landscape Architecture has also expanded. It is also in line with the findings of the **European Landscape Convention** on the right of everyone to the landscape, the preservation of its values and its transmission to future generations. Similarly, the changes made in 2018 in the classification of Latvian science branches and sub-branches, which form wider thematic blocks, have affected the previous education and **admission requirements** for potentially admitted students in the doctoral study program Landscape Architecture. They also allow students whose previous education is closely linked to landscape research and landscape architecture (architecture, urban planning and spatial planning) to start studies in the programme. In accordance with the trends of recent years, when looking at the landscape interdisciplinary, the topics of doctoral theses are selected, such as green infrastructure and ecosystem services in the landscape, cultural heritage, contemporary art in the Latvian cultural landscape, watermill and small hydro-power plant (HPP) landscapes in Latvia, architecture and landscape interaction, , Latgale sacred landscape, adaptive solutions to climate change in urban landscape, rehabilitation landscape, etc. The interdisciplinary approach is closely related to the **learning outcomes the study program**:

Knowledge:

- on current scientific theories and findings in landscape architecture and their relation with other fields of science;
- and a high level of understanding of research methodology and modern research methods in landscape architecture.

Skills:

- to independently evaluate and choose internationally recognized research methods appropriate to scientific research;

- apply their research skills when conducting research in a field of which they are part at the level of internationally cited publications;
- to present and prepare reports at international scientific conferences on the topical issues of their research and research in the field of landscape architecture;
- to implement scientific projects independently or in a team, accomplishing achievements at the international level;
- to solve research problems and provide knowledge independently or in a team, in accordance with the current issues of landscape architecture science and interdisciplinary research;
- to independently prepare and present study materials in the field of landscape architecture.

Competencies:

- to independently solve significant research or innovation tasks in the field of landscape architecture;
- to formulate independently the research problem, hypothesis or basic research question, create a research plan, work on data collection and analysis, formulate research results and conclusions;
- to convincingly demonstrate their abilities and knowledge in the implementation of scientific projects or research and in the development of new projects or research ideas.

After the successful defense of the dissertation, **a degree of Doctor of Science (Ph.D.) in Arts, Music and Architecture is awarded**, which corresponds to the new expanded thematic group in the classification of Latvian sciences and sub-disciplines, as well as provides an opportunity for interdisciplinary research in landscape research.

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 need for high-quality scientific and academic staff in the field of landscape architecture and landscape research is determined by a number of international strategies and modern initiatives. The content of the doctoral study programme Landscape Architecture implemented by LLU is based on the latest research findings in the fields of landscape research and landscape architecture. The content of the study programme consists of several blocks. The first block is **Compulsory courses (theoretical study courses)** (10 CP), which includes a course of research methodology and obtaining professional foreign language. **Restricted sub-discipline elective courses** (16 CP) include the main findings on landscape transformation processes and the latest trends in landscape architecture and landscape research. Within the **Scientific work section** (94 CP), based on the findings of theoretical studies, a research is developed and tested in one of the relevant topics of

the field. Within the framework of the programme, as well as within the research of doctoral students, the following research blocks and topics are considered:

Housing areas aimed at improving the quality of the living environment and sustainable development of areas, including adaptation to climate change and the creation of green infrastructure. It is covered in the following topics:

- urban gardens in multi-storey residential areas;
- green recreation of courtyard areas;
- sustainable storm water management systems;
- roof gardens, etc.

Public spaces, which are related to the current topic of social integration and participation, the development of inclusive and accessible territories, include the following topics:

- squares, parks, forest parks, promenades;
- urban agriculture and gardens in public spaces;
- synthesis of music and art in the urban environment (sculpture, open-air stages, green bridges, etc.).

Rural landscape and cultural heritage, aimed at the identification, conservation and intelligent management of natural and cultural assets, includes the following sub-themes

- manor parks, churches, hillforts;
- industrial heritage areas;
- military heritage areas;
- Water landscape, forest landscape, road landscape,
- Anthropogenic agro-load;
- National and regional identity of landscape.

At the end of the doctoral studies, a doctoral thesis is elaborated. After successful defense of the doctoral thesis a Doctor of Science (Ph.D.) in Arts, Music and Architecture is awarded. The **awarding of a scientific degree Ph.D is based on the achievements and findings of the field of landscape architecture and planning**, as the topics of doctoral theses are closely related to the current topics and strategies of the field mentioned below. The topics of doctoral theses are described in more detail in *Section 2.5* of the study program report.

The research topics of the study courses and doctoral students of the programme are based on the findings of the **European Landscape Convention**, which are aimed at identifying, preserving and passing on the specific nature of each country's landscapes, as well as everyone's right to a quality living environment and landscape around them. These principles are also set out in the **vision of LLU**, which emphasizes the sustainable use of natural resources to increase the quality of life of the society. The research blocks of the program coincide with the direction "*Research and development of urban and rural landscape*" defined in the **LLU development strategy for 2015-2022** (<https://www.llu.lv/index.php/en/mission-and-vision>), the aim of which is to identify, preserve and develop the value of Latvian cultural landscape, including the identification, preservation, development and management of values in the urban and rural environment as an essential component of national identity. Qualitative living environment and territorial development, including strengthening of national identity, are also included in several **strategic documents of Latvia**, such as the National Development Plan for 2021-2027, the Latvian Sustainable Development Strategy for 2030, etc.

Another thematic block of the programme is related to current initiatives, which include the principles of sustainable development and the green economy and are included in several

international strategies, such as the **European Green Deal**. These initiatives are also linked to the provision of biodiversity, ecosystem services, the development of adaptive solutions to climate change (**EU Biodiversity Strategy; EU Green Infrastructure Strategy**, etc.). These principles, in turn, are included in the Latvian Sustainable Development Strategy and in several initiatives based on the introduction of the circular economy in Latvia (**Latvian Bioeconomy Strategy**, etc.).

Industry, labor market and scientific issues in the field of landscape architecture and landscape research are regularly discussed by various networks, professional organizations (Latvian Association of Landscape Architects, Latvian Union of Architects, European Council of Landscape Architecture Schools (ECLAS), International Federation of Landscape Architects (IFLA), Nordic Association of Agricultural Science (NJF), International Council on Monuments and Sites (ICOMOS), etc.), within commissions, working groups, during scientific and practical conferences and seminars, in the implementation of research projects in which LLU Department of Landscape Architecture and Planning is actively involved teaching staff. Also, several lecturers of the programme are **experts of the Latvian Council of Science** in the field of Arts, Music and Architecture, full members of the Department of Engineering of the **Latvian Academy of Agricultural and Forest Sciences**, thus they are closely familiar with the scientific issues in the field.

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.

Taking into account that **LLU is the only university in Latvia that implements a doctoral study programme in the field of Landscape Architecture**, thus also preparing academic and scientific staff for education and research in this field, the aim and tasks of the programme are closely related to these processes. **The aim** of the doctoral study programme Landscape Architecture is to prepare highly qualified scientific specialists in the field of Landscape Architecture in accordance with international standards, providing doctoral students with high-level theoretical studies necessary for the development of a qualitative doctoral thesis and for obtaining a degree, as well as independent research, approbation and pedagogical work.

The tasks of the program according to the goal are:

- to train scientists and teachers in the field of Landscape Architecture, in accordance with international standards in the field;
- to provide students with an opportunity to acquire higher level theoretical study courses that promote the ability of doctoral students to conduct research independently or in a team;
- to ensure the acquisition of pedagogical practice by involving them in bachelor's and master's level study courses;
- to promote the publication of doctoral research results in high-level international scientific publications, as well as to independently prepare scientific publications both in the field of landscape architecture and in interdisciplinary topics;
- to provide students with the defense of the doctoral thesis in the branch promotion council, in accordance with the effective regulatory enactments.

Doctoral studies are organized in accordance with the Regulations of Doctoral Studies of the LLU <https://www.llu.lv/index.php/en/study-guide-documents> . The programme is implemented in accordance with the LLU doctoral study programme implementation guidelines, approved in 2017. November 29. The doctoral thesis is supervised and managed by the Vice-Rector for Science of the LLU, the study process is organized by the University Study Center and the programme director in cooperation with the faculty management.

The duration of full-time studies in the doctoral study programme Landscape Architecture is 3 years. The total amount of credit points is 120 CP (180 ECTS). **Theoretical studies** envisaged in the study programme take 22% of the total CP, the remaining 78% are intended for **scientific work**, which includes interconnected theoretical and experimental research in the chosen thematic direction of the sub-branch, as a result of which publications and doctoral thesis content are formed. Also, in parallel with the scientific work, **the presentation and publication of research results** takes place, as well as the integration of the main findings of the research into bachelor's and master's study courses within the framework of **research practice**. The direction of the research and the appropriate perspective supervisor of the thesis is selected and agreed with the doctoral student before the official admission. Study plans to be implemented in Latvian and English are provided in the *Appendix No.2.1* and *Appendix No. 2.2*.

Each doctoral student of the programme acquires the respective study courses and passes three doctoral exams: 1) special course of a foreign language; 2) theoretical studies in the sub-branch of science; 3) special course of the research direction. The doctoral examination is open, it is accepted by the examination commission approved by the Rector of the LLU and consisting of three doctors of sciences. The evaluation is given in a 10-point system in accordance with the LLU Study Regulations <https://www.llu.lv/index.php/en/study-guide-documents> .

The objective of the study programme **is to closely link with the tasks and outcome** of developing a high quality international for the young researcher and to base the studies on a block of theoretical studies and scientific work. At the same time, approbation of the research topic and pedagogical practice are being developed. Upon graduation, the programme provides:

Knowledge:

- on current scientific theories and findings in landscape architecture and their connection with other fields of science;
- and a high level of understanding of research methodology and modern research methods in landscape architecture.

Skills:

- to independently evaluate and choose internationally recognized research methods appropriate to scientific research;
- apply their research skills when conducting research in a field of which they are part at the level of internationally cited publications;
- to present and prepare reports at international scientific conferences on the topical issues of their research and research in the field of landscape architecture;
- to implement scientific projects independently or in a team, accomplishing achievements at the international level;
- to solve research problems and provide knowledge independently or in a team, in accordance with the current issues of landscape architecture science and interdisciplinary research;
- to independently prepare and present study materials in the field of landscape architecture.

Competencies:

- to independently solve significant research or innovation tasks in the field of landscape architecture;
- to formulate independently the research problem, hypothesis or basic research question, create a research plan, work on data collection and analysis, formulate research results and conclusions;
- to convincingly demonstrate their abilities and knowledge in the implementation of scientific projects or research and in the development of new projects or research ideas.

The results of the programme are achieved gradually, within the framework of the programme first strengthening the methodological side of research development in the study courses *Scientific research methodology* and *Research methodology in landscape architecture*. Research methodology courses cover both the basic principles and main methods of research development, as well as the approaches used specifically in the field of landscape architecture. Then what is acquired in these study courses is applied to their specific research, the theoretical and methodological part of which is defended in two doctoral examinations in the study courses *Landscape Transformation Processes (Theoretical Studies in Science sub-branch)* and *Course of Research Directions*. Promotion examinations have been formed as a scientific discussion for a doctoral candidate with members of the promotion exam (at least 3 doctors of science), by highlighting the common methodological approaches to research in a sub-sector of landscape architecture, but in the special course of the research through the topic of their dissertation looking at the theoretical and methodological framework in one of the three research blocks (residential areas; public spaces; rural landscape with cultural and historical heritage).

In accordance with the goal and tasks set by the programme, the content of **the study courses** (Appendix No.3) acquired in the doctoral study programme Landscape Architecture is directly related and purposefully directed to the development of a successful research work based on knowledge and theoretical substantiation, which concludes with a doctoral thesis. The connection between the study courses to be acquired in the doctoral study programme Landscape Architecture and the results to be achieved is reflected in the **Study Course Mapping** (Appendix No. 4).

During the reporting period, the **research directions and topics** included in the doctoral programme Landscape Architecture **are closely related** to the direction “*Urban and Rural Landscape Research and Development*” defined in the **LLU Development Strategy for 2015-2022** and the research implemented at the Department of Landscape Architecture and Planning. By strengthening the research directions implemented at the department, promoting their succession and development, at the same time creating an important information base, doctoral students are given the opportunity to join the research directions implemented at the department with their work topics or choose a topic of interest. In the case of interdisciplinary topics, it is possible to involve another research supervisor or work consultants in the dissertation. Thus, within the framework of the doctoral programme, there is a continuous cooperation between doctoral students and their supervisors, doctoral students are involved in research projects, publishing the obtained results in joint publications, most of which are indexed in SCOPUS and WoS scientific article databases.

Since 2012, the Department of Landscape Architecture and Planning has been publishing its **scientific journal Landscape Architecture and Art** https://llu.lv/Raksti/Landscape_Architecture_Art/, which is currently indexed by Scopus, Web of Science™, Clarivate Analytics / Thomson Reuters /, AGRIS, CAB Abstract, Crossref, EBSCO Art & Architecture Source, EBSCO Discovery Service, EBSCO The Belt and Road Initiative Reference Source, Primo Central (ExLibris). The journal also plays an important role in publishing the results of doctoral students' research, as Landscape Architecture and Art is the only scientific journal in Latvia in the field of landscape architecture and planning that simultaneously addresses both Latvian and

foreign scientists, as it is international and indexed in several known databases.

During the reporting period, the following research directions and topics of doctoral theses have been worked on:

Living areas (*quality of living space*)

- The importance of the quality of public space in large-scale residential areas in the processes of its use;
- Landscape plan as a tool for landscape planning, management and protection in Latvia;
- Adaptive planning to climate change in urban environment.

Public spaces (*public participation and the right to a quality landscape for everyone*)

- Aesthetic and ecological interaction in planning of Latvian urban green areas;
- Interaction of landscape and interior in the architecture of Latvian educational and art buildings;
- Landscape quality of rehabilitation gardens and parks;
- Landscape in the context of its healing factors;
- Functionality of urban forest landscape and development perspectives in the context of resilience and climate change;
- The Development of culture-historical landscapes and architectural heritage in interaction.

Rural landscape and cultural heritage (*cultural and natural values in landscape*)

- Latvian historical gardens and parks in a modern rural landscape;
- Contemporary art in the Latvian cultural landscape;
- Identity of Baltic Sea coastal landscapes in Latvia;
- Landscape of Latgale churches;
- Landscapes of watermills and small hydro-power plants (HPPs) in Latvia;
- Road landscape, their values and development scenarios;
- Industrial heritage landscape on the Baltic coast;
- The transformation process of rural landscape from the end of the 19th century - beginning of the 21st century;
- Green infrastructure in the context of landscape management in Latvia.

Most doctoral students who are graduates of LLU often continue their research started during their Master's studies. Some **doctoral students supplement the teaching staff** in departments of Landscape Architecture and Planning and acquire pedagogical experience. In total, 5 graduates, including 3 graduates of the programme who have obtained a doctoral degree in the reporting period, continue to work at the LLU as teaching staff, scientific and administrative staff. At present, the new doctors have already been elected to academic positions as professors, associate professors, docents, leading researchers and researchers, they also work with students of all levels and continue to work on research projects and contracts with companies and municipalities. The attraction of doctoral students to the study process was also facilitated by the project "Development of LLU academic staff" implemented in the 2019/2020 study year (No. 8.2.2.0/18/A/014), within the framework of which 1 doctoral student of the Doctoral Program in Landscape Architecture was involved in academic work. After the implementation of the project activity, the doctoral student has already successfully defended the dissertation and continues to work at LLU as an elected academic staff - assistant professor and leading researcher at the Department of Landscape Architecture and Planning. Also, 2 doctoral students of the programme are currently working in the department as lecturers and research assistants in the projects.

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 most important part of the work aimed at results (doctoral thesis) of the doctoral studies is **scientific research**. LLU scientific laboratories, computer software, sources of scientific information of the Fundamental Library, as well as research resources of other Latvian scientific institutions are used for this purpose, if necessary. Every year, the doctoral student speaks at seminars and conferences, presenting the obtained research results, followed by scientific publications, the content of which gradually turns into a doctoral thesis.

The applicant for the scientific degree submits the completed doctoral thesis to the LLU Administrative Center for registration. After registration, the Administrative Center sends the doctoral thesis to the Promotion Council of the LLU in the discipline of "Arts, Music and Architecture". The Promotion Council under the leadership of the Chairman carries out the promotion procedure in accordance with the Cabinet Regulations of the Republic of Latvia of December 27, 2005 No. 1001 "Procedures and Criteria for Awarding a Doctoral Degree (Promotion)", specified in the Regulations of LLU on Promotion and Promotion Councils (last amended on 13 May, 2020). After the successful defense of the dissertation the applicant in the period until 2019 was awarded the degree of Doctor of Architecture (dr.arch.) in Landscape Architecture sub-branch, but since 2020 Doctor of Science (Ph.D.) in Arts, Music and Architecture.

General principles and approaches in the implementation of studies:

- **Organization of study courses** - there are always lecture materials presented by the lecturer. To learn the study courses, lecturers and students use LLU **Moodle e-studies** (*especially relevant during the Covid-19 pandemic*), which helps to publish materials and video lectures for students, to conduct online lectures and seminars, students are able to submit their work, and lecturers - to publish the evaluation. Also, in this environment it is possible to provide feedback, comments on the submitted works, to communicate, as well as create a transparent and easy-to-understand e-environment for each study course, where the student can find all the necessary information about the course.
- To facilitate **communication**, an e-mail has been created for each student and lecturer at LLU, but communication with all parties involved in the study course is possible through the e-learning environment.
- **The study environment** is organized in the study building of Valdeka Castle, where students have access to work premises, as well as a methodical cabinet with industry books and other materials, with free access to the databases subscribed to by the LLU Fundamental Library. There is also access to computer classroom with all the necessary computer programs, large-format scanning, printing and laser cutting.

The **principles of student-centered education** in the study programme are implemented as follows:

- Respecting the needs of students, the study environment accessible to each student is ensured, the accessibility of the environment in the premises is also ensured. Students have the opportunity to attend classes and use study and scientific equipment, to use the study

infrastructure also outside of classes.

- Lecturers are available for students for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail. Students are provided with both mandatory and additional consultations, providing the support of the lecturer.
- Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of reconciliation of study courses when returning from mobility.
- The review of student complaints is regulated by the LLU Study Regulations <https://www.llu.lv/en/study-guide-documents>, but complaints are also reviewed by the commission. In addition, students are invited to seek assistance by escalating the issue, starting from the director of the study programme, the head of the department, vice-dean, dean and, finally, the vice-rector for studies.
- Ensuring mutual respect and participation of students and lecturers, the Code of Ethics of the LLU has been developed https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf.
- Student evaluation criteria are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria when starting the specific study course.
- The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works.

LLU has developed Study Regulations, which envisage the **evaluation** of students' works, using qualitative and quantitative evaluation methods:

- **For the qualitative assessment**, 10-point scale criteria are used (*1 to 10 points, successful assessment starting from 4 points*) or the pass/fail assessment (https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf)
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS).

The main approaches in the implementation of doctoral studies in Landscape Architecture for the fulfillment of the goals and tasks of the programme and the achievement of the results:

- qualitative individual study plans and regular control of their implementation in accordance with the LLU doctoral regulations;
- involvement of local and foreign consultants within specific topics in the research development process;
- regular participation in international conferences;
- publications in internationally quotable editions;
- participation in international doctoral seminars and development of joint projects.

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 includes **pedagogical practice**, which is implemented within 4 semesters, with the doctoral student practicing at the level of both the bachelor's and master's study programme.

Practice tasks form a connection **with the results of the study programme**

- a young scientist develops the ability for inductive logic,
- learn to present the acquired scientifically innovative knowledge to the audience,
- logically structure communication with the audience.

Pedagogical practice is also related to the study courses *Presentation of Research Results I, II, III, IV, V*, which are included in the study programme in the amount of 23 CP. Within the framework of pedagogical practice, the doctoral student acquires not only the ability to work with students, but also to structure and present in a concentrated way the main findings and results of his/her research. The doctoral student's pedagogical practice is supported and managed by the leading academic staff of the specific study course at the bachelor's/master's level.

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 topic of the dissertation is defined by entering doctoral studies, assessing in each individual case its topicality in the field, as well as compliance with the research direction "Research and Development of Urban and Rural Landscape" marked in the LLU development strategy. An overview of the topics developed in the doctoral study programme in Landscape Architecture is given in 2.2. section. The topics of the 9 doctoral theses defended in the reporting period have contributed to the field of landscape architecture, as well as promoted the development of research in the Department of Landscape Architecture and Planning.

In 2013, the doctoral thesis "**Latvian Historical Gardens and Parks in the Modern Rural Landscape**" was defended. Within the framework of the topic, the ecological, cultural-historical and social values of historical parks are described. The doctoral student has participated as an expert in an international project focusing on important, nationally relevant issues of cultural and historical landscape management, which require an integrated approach. This topic is also continued by the doctoral dissertations currently under development - "Fragmentation of the Cultural-Historical Landscape Space in Latvia in the 17th-21st Centuries." **Research on cultural and historical landscapes** has been carried out from the very beginning of the specialty of landscape architecture, within the framework of the research books "Valdeka Castle" and "Mazmežotne Manor" have also been published, which are used in bachelor's studies. The theme was continued in the Interreg Latvia-Lithuania Program project "Sustainable Integration of Novel Solutions into Cultural Heritage Sites" (NovelForHeritage). Within the framework of the project, the attractiveness of Eleja manor park and Žagare manor park for tourists will be increased. Both parks have been designed by landscape architect and gardener G.Kūfalts, who, at the turn of the 19th-20th centuries, was known throughout Europe. The involvement of the Latvia University of Life Sciences and Technologies and the Lithuanian Natural Heritage Foundation in the project will provide a scientific and practical approach that will be of interest to landscape architects. Within the framework of the project, a book will be published, the topics will be integrated into bachelor's

studies, students, including 1 doctoral student, will also be involved in the project activities.

Knowledge about the preservation of cultural and historical heritage has also helped the LLU study building in **the development of Valdeka Castle** as a Baltic-wide landscape architecture education and research center.

In 2014, two doctoral theses were defended - ***"Identity of Baltic Sea Coastal Landscapes in Latvia"*** and ***"Landscape of Latgale Churches"***, but in 2013 - ***"Contemporary Art in the Latvian Cultural Landscape"***, in 2019 - ***"Interaction of landscape and interior space in the architecture of Latvian educational and art buildings"***. The doctoral student is currently conducting a study on Latvia's industrial heritage on the Baltic coast. The works mark a research direction related to **the identification and preservation of Latvia's unique and symbolic landscapes**. The authors of both works continue to work at the Department of Landscape Architecture and Planning after obtaining a doctoral degree, which allows to strengthen and further develop this research direction, to integrate all levels of landscape architecture in the study process. Thus, the research topic is continued in the research project of the State Research Program (No. VPP-VARAM-ITAZRI-2020/1-0002) **"Sustainable Management of Land Resources and Landscapes: Assessment of Challenges, Methodological Solutions and proposals "** (LandLat4Pol) (01.12.2020 - 30.11.2022). The acquired knowledge and results will serve as a basis for recommendations to policy makers in regard to land use and landscape policy, strategic and spatial planning, the common agricultural policy and environmental protection. Examples of good practice will be prepared for industry professionals and researchers in the project scope. The study will provide new knowledge and solutions needed to develop a balanced use of land resources and sustainable landscape management in Latvia. For the first time in Latvia, comprehensive alternative scenarios and dynamic models for land resource efficiency will be developed, as well as a basis for an interactive landscape atlas. Within the project, master students and doctoral students are involved. The results obtained during the research will supplement the content of the study programme, as well as increase the qualification and experience of the teaching staff. In addition, in the scope of the project it is intended to create a Master's specialization **"Landscape Management"**.

In 2015, the doctoral thesis ***"Landscapes of Watermills and Small HPPs in Latvia"*** was defended, which marks a direction related to **the integrated management and use of natural resources in landscape architecture solutions**. This topic is very relevant, because natural resources are an important element of tourism, but at the same time also ensure the ecological quality of the place. The need for **sustainable and climate-adapted rainwater management solutions** is also emerging. The topicality of the topic is also marked by several cross-border cooperation projects, in which it is continued. The projects have been developed in cooperation with local and foreign municipalities, pointing to the topicality of the topic at the municipal level. Latvian-Russian Cross-border Cooperation Program 2014-2020 project **"Sustainable Use of Water Resources for Tourism Development in Latvian-Russian Border Towns - Rēzekne and Ostrov"** (LV-RU-017) Urban Sticky Areas. (2019-2021). Project partners are developing research on water basins in Rēzekne and Ostrov. An integrated handbook on natural resource management and a common cross-border approach to the integrated natural resources management will be developed. Bachelor's and master's students, also 1 doctoral student, participate in the project. The topic is also addressed in the Interreg Baltic Sea Region project **"Water driven rural development in the Baltic Sea Region"** (WATERDRIVE). Within the framework of the project, it is possible to share experience, access information, promote public involvement in various approaches to address and inform, as well as introduce new and smart management measures on agricultural land. Spatial planning to control the risks of climate change - droughts and floods in downstream agricultural areas - a new risk mitigation system.

In cooperation with the municipality, the topic was continued in applied research. The Department

of Landscape Architecture and Planning has developed a thematic plan “Development concept for Daugava River landscape in Aizkraukle”. Commissioning party - Aizkraukle Municipality Council. Both lecturers and students are involved in the implementation of the project, working on the research of the territory, as well as the development of the development concept and gaining practical experience. The methods developed in the project are integrated in the study process.

In 2016, the doctoral thesis “**Aesthetic and ecological planning of green areas of Latvian cities**” was defended, which outlines the current **directions of green infrastructure, biological diversity and bioeconomy**. The topic is also continued by several currently studying doctoral students in their doctoral theses “The role of urban territory and green structure in obtaining aesthetically high quality of settlements” and “Planning adapted to climate change in the urban environment”. The topic is important, which is also confirmed by the research continued within the topic in cooperation with the municipality. For example, Interreg Latvia-Lithuania Programme 2014–2020 project „Innovative brownfield regeneration for sustainable development of cross-border region” (BrownReg). (1.03.2018.-31.08.2019.) The project, in cooperation with LLU and Latvian and Lithuanian municipalities, addressed the possibilities of revitalization of former industrial territories. Within the framework of the project, a good practice guide on brownfield revitalization has been published, which is used in the master's study course Industrial Landscape Design. This course also includes several insights from the results of the project, as well as within the study course students had the opportunity to participate in the project and gain new knowledge in thematic seminars with lecturers from various fields involved. The project modeled 3D development scenarios, marking digital tools as a successful approach in research and public information.

The research direction also continues in the form of applied research in cooperation with local governments, for example, a thematic plan “Landscape concept for Ikšķile town and villages” has been developed. The methods developed in the project are integrated in the study process.

In 2019, the doctoral dissertation “**Landscape Quality of Rehabilitation Gardens and Parks**” was defended, which actualizes **the landscape as a living space and an important resource for the physical and mental health of society**. In connection with this topic, the Department of Landscape Architecture and Planning has developed a concept for the development of green areas and facilities for VSIA Pauls Stradiņš' Clinical University Hospital. Commissioning authority - VSIA “Pauls Stradiņš Clinical University Hospital”.

In 2019, the doctoral thesis “**Road landscape, their values and development scenarios**” was defended, which included a new approach in the field of **landscape architecture and planning based on the use of 3D digital tools**. The new doctor of sciences continues to work at the Department of Landscape Architecture, which allows the knowledge gained in the research to be transferred to the study process of landscape architecture at all levels, as well as to continue research work. The doctoral student together with the researchers of the department participated in the Interreg Latvia-Lithuania Program 2014-2020 project “Creation of Joint GI Education to Increase Job Opportunities in the Region” (No. LLI-206) (2017-2020), which developed approaches to the use of ArcGIS programs for landscape research, planning and management with the aim of integrating the use of ArGIS in separate study courses in both bachelor's and master's study programs, as well as in research. Currently, ArcGIS applications are increasingly used in research, as they provide more accurate data interpretation, interactive feedback, and better process modeling and monitoring capabilities. To support the use of digital tools in the study process and research, a computer class with 25 high-performance workstations with appropriate software has been set up in the Valdeka study building. The class was created by attracting European Union funds.

The evaluation of doctoral theses takes place in accordance with the *regulation of the Cabinet*

of Ministers No. 1001 "Procedure of and Criteria for Awarding Doctoral Scientific Degree" and LLU Regulations "On promotion boards and promotion" (https://www.llu.lv/sites/default/files/2020-05/LLU_promocijas_nolikuma_grozijumi.pdf (in Latvian)) at the open meeting of the LLU Promotion Board in Arts, Music and Architecture Sciences after defending the doctoral thesis. The decision to award or refuse the degree - Doctor of Science (Ph. D.) - is made by the board by a majority vote, open voting. If the votes are equally divided, the board shall hold a discussion and vote again. If, after re-voting, the votes are equally divided, the board shall re-examine the work, but not earlier than one month and not later than six months after the meeting of the promotion board at which no decision was made. Until the next meeting of the board, an applicant has the right to make corrections in the dissertation after coordination with the chairperson of the board.

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.

Taking into account the small number of students and graduates in the programme, the opinion on the study process and the necessary improvements is mainly gathered in **individual discussions with students and graduates** and taken into account in the distribution of the content and structure of the programme. Main lessons learned from student surveys and interviews:

- the doctoral student must maintain a high level of research work/ process intensity throughout the 3 years of study, which is hampered by the need to combine doctoral studies with work, as insufficient funding is available for the conduct of the research; as the intensity in the professional field increases (or private problems arise), the productivity of research activity decreases (85% of doctoral students take academic leave).
- the motivation of the research process should not be lost, which would be better ensured if grants were available to carry out the research;
- the studies provide a wide range of multifaceted applications of knowledge in different sectors – both fundamental and academic, applied and professional (within the framework of local governments, ministries, academic and research work, private practice).

The opinion of students and graduates is taken into account in the improvement of the organisation of the study process and the content of the study programme. In general, in order to promote students' motivation for the implementation of their research and the development and defence of the doctoral thesis, the LLU has identified the need for support mechanisms. In the last two years, the LLU has worked on support programmes for doctoral students, for example, LLU programmes "Strengthening Scientific Capacity of LLU" and "Carrying out Fundamental Research at LLU" provide the opportunity to apply for funding for research, as well as to ensure publicity in international conferences. Also, by 2020 to 2026, the university aims to create a new model for the development of doctoral study programmes in the fields of strategic specialization of the LLU, therefore in 2020 the LLU Doctoral School was established. Starting from 2021, a new support programme has been launched within the framework of this initiative, which allows doctoral students to apply for a grant for the performance of research within the framework of the project "LLU Transition to the New Model for Funding Doctoral Studies" (No. 8.2.2.0/20/I/001).

Within the framework of the doctoral study programme itself, improvements have also been made in order to promote greater motivation for the development of the research and maintenance of

research activity throughout the study process. After the improvement of the programme, the content of the theoretical part of the study courses and the work to be performed are closely related to the topic of the doctoral research. The content and topics of the doctoral examinations in the field of science and subsector are also discussed and discussed within the framework of the doctoral thesis topic. Until now, doctoral students have been involved in the academic work, but this was not included in the programme plan. With this in mind, the improved programme plan includes pedagogical practice, within the framework of which the doctoral student gets acquainted not only with the academic work under the guidance of competent supervisors, but also strengthens his or her skills to outline the main findings and results of their research in a concise way. Similarly, several new study courses have been created, within the framework of which research work is carried out and publicity of results is ensured (study courses *Research I, II, III, IV, V*; *Publication of Research Results I, II, III, IV, V*; *Presentation of Research Results I, II, III, IV, V*). Thus, the need indicated in the survey to increase the amount of publicity of the study in conferences and scientific journals is also taken into account. Support for the publicity of the research is also provided by the **scientific journal Landscape Architecture and Art** https://llufb.llu.lv/Raksti/Landscape_Architecture_Art/ issued by the Department of Landscape Architecture and Planning since 2012 and currently listed on Scopus, Web of Science™, Clarivate Analytics /Thomson Reuters/, AGRIS, CAB Abstract, Crossref, EBSCO Art & Architecture Source, EBSCO Discovery Service, EBSCO The Belt and Road Initiative Reference Source, Primo Central (ExLibris). Landscape Architecture and Art is the only scientific journal in Latvia in the field of landscape architecture and planning, which simultaneously addresses both Latvian scientific audience and foreign scientists, as it is international and indexed in several known databases.

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.

In doctoral study programmes, international mobility takes place only within the framework of very intensive activities, because students are actively working on research, as teaching staff or professionals in the field, many have families with children, as a result of which long absences are impossible. Therefore, the outgoing international mobility of students of the doctoral study programme Landscape Architecture has mainly taken place within the framework of the following activities (*Table 1*):

- **ERASMUS+ international mobility programme.** In the reporting period, two types of mobility can be distinguished within the ERASMUS+ programme: student internships and student mobility, as several doctoral students are also teaching at the Department of Landscape Architecture and Planning at the same time. A total of 1 doctoral student has used this activity and gained research and academic experience in Portugal, Hungary, Iceland, the United Kingdom, Estonia and Turkey. The LLU has ERASMUS+ mobility agreements with several foreign universities, while doctoral study mobility in landscape architecture or related fields is offered by 8 universities in Estonia, Lithuania, Portugal, Slovakia, Turkey and Hungary. However, if a doctoral student is also a member of the teaching staff, then mobility opportunities increase as teaching staff are offered a wider list of universities.
- **LLU support programmes for the implementation of doctoral studies:**
 - Until 2015, the ESF co-financed project “Support for the implementation of doctoral studies of the LLU” (No. 2009/0180/1DP/1.1.2.2/09/IPIA/VIAA/017) was implemented,

within the framework of which grants were awarded to doctoral students in the form of a monthly scholarship, as well as for the development of research and publicity of results. During the reporting period, 3 students of the doctoral study programme Landscape Architecture presented their research at international conferences (in Lithuania and Poland);

- The LLU programmes “Strengthening Scientific Capacity of LLU” and “Carrying out Fundamental Research at LLU” have been implemented since 2018 and provide the opportunity to apply for funding for research, as well as to ensure publicity in international conferences. These support tools for international mobility have also been used by 2 doctoral students in the doctoral programme of Landscape Architecture to participate in international conferences in Belgium and the Czech Republic.
- **Other research and academic projects.** Doctoral students are involved in research work and projects of the Department of Landscape Architecture and Planning, which allows them to share the results of their research at conferences or go to foreign universities for exchange of experience. For example, the EEA co-financed project “Research and Scholarships”, Interreg Latvia-Lithuania Programme 2014-2020 project “Creation of Joint GI Education to Increase Job Opportunities in the Region”.
- **Within the framework of LLU VBF funding** (conferences, doctoral workshops, etc.). One of the opportunities to consult and discuss the implementation and methods of one’s research with internationally recognized professionals and scientists in the field is to participate in doctoral workshops held at annual international conferences organised by the Council of European Schools of Landscape Architecture (ECLAS). At the same time, the doctoral students have the opportunity to report at the conference. During the reporting period, 2 doctoral students used this opportunity to participate in ECLAS conferences in Germany, Estonia, Switzerland, Great Britain, Belgium, Norway.

Table 1

Mobility of students of the Programme within different international activities

Academic year	LLU funds	ERASMUS+ NordPlus	Other projects	Funding of the Faculty of Environment and Civil Engineering
2012./2013.	Lithuania (2) Poland (2)			
2013./2014.	Germany (2) Estonia (1) Lithuania (1)			Germany (1)
2014./2015.	Portugal (1)	Portugal (1) Hungary (1)		
2015./2016.		Estonia (1) Iceland (1)	Norway (1)	Estonia (1)
2016./2017.				Switzerland (1)

2017./2018.	Belgium (1) Czech Republic (1)	Great Britain (1) Estonia (1) Portugal (1)		Great Britain (1) Estonia (1)
2018./2019.		Turkey (1)		Belgium (1)
2019./2020.*			Lithuania (1)	

* In 2019/2020 international mobility was affected by the restrictions imposed by the COVID-19 pandemic. The number of students participated in the particular mobility is shown in the brackets.

Starting **from 2021, a new Doctoral School support programme** has been launched within the framework of this initiative, which allows doctoral students to apply for a grant for the performance of research within the framework of the project “LLU Transition to the New Model for Funding Doctoral Studies” (No. 8.2.2.0/20/I/001). Support will also include an opportunity for international mobility.

Incoming mobility of foreign students is observed only within the framework of intensive courses. Just like doctoral students in the programme, foreign students have the opportunity to devote one or two weeks to mobility, within the framework of which intensive training, consultations and exchanges of experience take place. In order to develop broader international cooperation and share experience, the Department of Landscape Architecture and Planning has organised two intensive training courses for doctoral students and teaching staff during the reporting period within the framework of the BOVA (Baltic Forestry, Veterinary and Agricultural University Network) programme:

- In the 2015/2016 academic year, 3 students from the Estonian University of Life Sciences and Aleksandras Stulginskis University, Lithuania participated in the BOVA intensive doctoral course “Landscape Cognition”. Within the framework of the joint cooperation between students and teaching staff, a joint publication was developed: *Zigmunde D., Nitavska N., Vugule K., Storie J., Katlapa A., Kalniņa A., Mengots A. (2016) Landscape Cognition. Landscape architecture and art, Vol. 8, No. 8, p. 31-42*, which is also indexed in Scopus and WoS databases.
- In 2017/2018, 5 doctoral students from Häme University of Applied Sciences and Estonian University of Life Sciences participated in BOVA intensive courses for doctoral students and teaching staff at Academic Writing for Landscape Architects.

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 LLU website contains information **on doctoral study programmes**, detailed information on admission rules, admission procedure and forms of admission documents to be prepared <https://www.llu.lv/lv/doktora-studijas> (in Latvian). The potential doctoral students can get acquainted with the admission criteria for state-funded doctoral study places: <https://www.llu.lv/lv/doktora-studiju-iespejas> (in Latvian). Information is also available to potential applicants for doctoral studies from abroad: <https://www.llu.lv/en/degree-programmes>. Information about the Doctoral study programme Landscape Architecture is available at <https://www.llu.lv/lv/doktora-studijas/ainavu-arhitektura> (in Latvian) and at <https://www.llu.lv/en/doctoral-study-programme-landscape-architecture> (in English).

All LLU normative documents related to doctoral studies are easy to find and access on the LLU website: Regulations on doctoral studies; Regulations on the competition procedure for state-funded doctoral study places; Scholarship award regulations; Guidelines for doctoral studies. Also, all the necessary application forms, study year plan and report forms are available, as well as information on the study procedure, theoretical study courses and other current information is provided at <https://www.llu.lv/lv/aktuala-informacija-studejosiem> (in Latvian). Regulation of Doctoral Studies in English is available at <https://www.llu.lv/index.php/en/study-guide-documents>.

In order to facilitate studies, a register of study courses has been created, where students can get acquainted with the descriptions of study courses, obtain information about the acquisition of courses, assessment requirements <https://lais.llu.lv/pls/pub/kursi.startup?l=1> (in Latvian and English). In the study process, the teaching staff makes extensive use of the LLU e-learning system (program MOODLE), where study materials are published, lectures are organized online, etc. In the LLU information system (LLU IS), each student / doctoral student can use his / her user account to follow his / her study progress.

A special section of the website contains information and documents on the promotion procedure: Cabinet Regulations No.1001 and No.1000; Regulations for the technical design of the scientific work to be submitted to the Promotion Council, as well as the LLU promotion documentation <https://www.llu.lv/lv/promocijas-kartiba> (in Latvian).

The leading department in implementation of the doctoral study programme "Landscape Architecture" is Department of Landscape Architecture and Planning of the Faculty of Environment and Civil Engineering. Separate study courses are implemented by the academic staff of the Department of Control Systems of the Faculty of Information Technology (study courses related to the basic principles of research methodology), the Language Center of the LLU (study courses of English and Latvian for international students) and the Institute of Soil and Plant Sciences of the Faculty of Agriculture (academic writing).

The resources of the study programme consist of three groups – material and technical base (tools and equipment), software and literature. Additional financial resources for the implementation of publicity for research and research results.

Study and scientific literature, databases

Literature on the following topics is available in the **Fundamental Library of LLU, VBF Information Center and the Valdeka Training Building Methodological Classroom** - Landscape and nature; Ecology and environmental protection; History of architecture and garden

art, cultural history; Landscape planning; Greenery; Outdoor building materials and elements; Construction and maintenance of facilities; Landscape management, economics, management; Environmental psychology, landscape sociology; Public involvement, marketing, communication; industry scientific journals. Students also have access to the scientific journal "Landscape Architecture and Art" of the Department of Landscape Architecture and Planning, both in printed and digital form https://llufb.llu.lv/Raksti/Landscape_Architecture_Art/, which also reflects the research of foreign and Latvian scientists in the field of landscape architecture and planning. Publications of the teaching staff from the Department of Landscape Architecture and Planning are also published regularly in the journal. **The teaching staff**, working in on various projects, have **also prepared and published several books during the reference period in relation to topical landscape issues and research**. For example:

- Remediation of brownfields. Research. Planning. Management (2019) (Berzina M., Grinfelde I., Īle U., Jankava A., Katlapa A., Turks M., Ņitavska N., Parsova V., Pilecka J., Skujane D., Spase A., Straupe I.) Jelgava: LLU, 133 p. (in Latvian, English and Lithuanian)
- Ņitavska N., Zigmunde D. (2013) Guidline for green urban planning (in Latvian. Rokasgrāmata. Zaļas pilsētvides plānošana. Informatīvi izglītojošs materiāls pašvaldību attīstības plānotājiem). Jelgava: Zemgales Plānošanas reģions. 114 lpp.
- Burkāne I., Ziemeļniece A., Zilgalvis J. (2019) Mazmežotne manor (in Latvian. Mazmežotnes muiža). Mazmežotne: Mazmežotnes muiža. 120 lpp.
- Ziemeļniece A. (2017) Valdeka palace (in Latvian. Valdeka pils). Jelgava: Jelgavas Tipogrāfija. 49 lpp.

LLU database subscriptions can be used to search for information sources that are not available in the library collection, as well as interlibrary loan services can be used. The search engine LLU Primo Discovery, online databases BIS Aleph500, online databases created in the Fundamental Library of LLU (8 databases of different levels) are available for searching of scientific literature. Faculty and doctoral students are informed about databases to which access is granted on a temporary basis. Databases of lecturers' publications and doctoral theses have also been created. The staff of the library provides consultations on current events, as well as advises students on searching for scientific information.

Doctoral students have access to databases subscribed to by the LLU:

- CABI data base, CAB Abstracts EBSCOhost;
- Taylor & Francis Group CRC Press e-books;
- EBSCOhost data base;
- ScienceDirect journals;
- Web of Science;
- Scopus;
- Scival;
- Wiley Online Library;
- LETONIKA.

Students also have access to the LLU library remotely, as well as access to scientific databases using their student access passwords <https://llufb.llu.lv/en>.

Significant additions to the research and study literature have been implemented within the framework of various projects, for example, books purchased in recent years and several e-books have been subscribed to within the framework of the project "Modernization of LLU STEM study programmes" (No. 8.1.1.0/17/I/001).

Materials and technical base. Based to the theme of their research, doctoral students use

laboratory resources and computer classrooms of the Faculty of Environment and Civil Engineering.

Doctoral students of the programme have the opportunity to use the auditoriums and work spaces of the Valdeka building, both during and outside working hours. Workplaces equipped with computer equipment, the necessary specific software and access to the databases subscribed by the LLU Fundamental Library are available in the working space.

Valdeka building computer class has 25 high-performance workstations equipped with software designed for landscape research and analysis of the obtained data, as well as for the development of 3D territory development models (ArcGIS Pro, Photoshop, SkechUp, AutoCad, Revit, Lumion). The ArcGIS Pro license also allows using various data collection applications on smart devices – smartphones and tablets (Survey123, Collector etc.).

GIS Competence Centre. The Competence Centre is located in the main study building of the Faculty of Environment and Civil Engineering, and the work there takes place in cooperation with the Department of Land Management and Geodesy. They are equipped with state-of-the-art equipment for remote sensing and precise geodetic measurements, tools and hardware are available, GNSS instrument kit Stonex S700A, terrestrial 3D laser scanner kit Stonex X300, GNSS receiver Trimble R8 GNSS kit, GP Base Station Kit with software, GP Base Stations receiver geodetic antenna, meteorological station 10-WC-18-A, robot-tachymeter set with equipment, rotary level, level-digital set and other equipment. In cooperation with the GIS Competence Centre, it is possible to obtain data on the research area and to process them in specific programmes (ArcGIS Pro, Microstation).

For specific research, **LLU researchers and doctoral students have access to scientific laboratories and equipment also in other structural units of LLU**, by prior agreement. Information on available scientific equipment at LLU is compiled in a single database and is freely available at <https://www.llu.lv/lv/zinatniska-inventara-datubaze> (in Latvian)

Provision of financing. The number of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for **Master's programmes is 1.5** and the social funding of one study place for PhD programmes is 1009.53 EUR, the study cost **coefficient for the PhD programme “Landscape Architecture” is 3.37** (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers “Procedures for Financing Higher Education Institutions and Colleges from the State Budget”), costs per student in the PhD study programme “Landscape Architecture” amount to 17483.75 EUR. In 2019./2020, the **tuition fee** in the study program is 3000 EUR per year for Latvian students and 5000 EUR per year for foreign students.

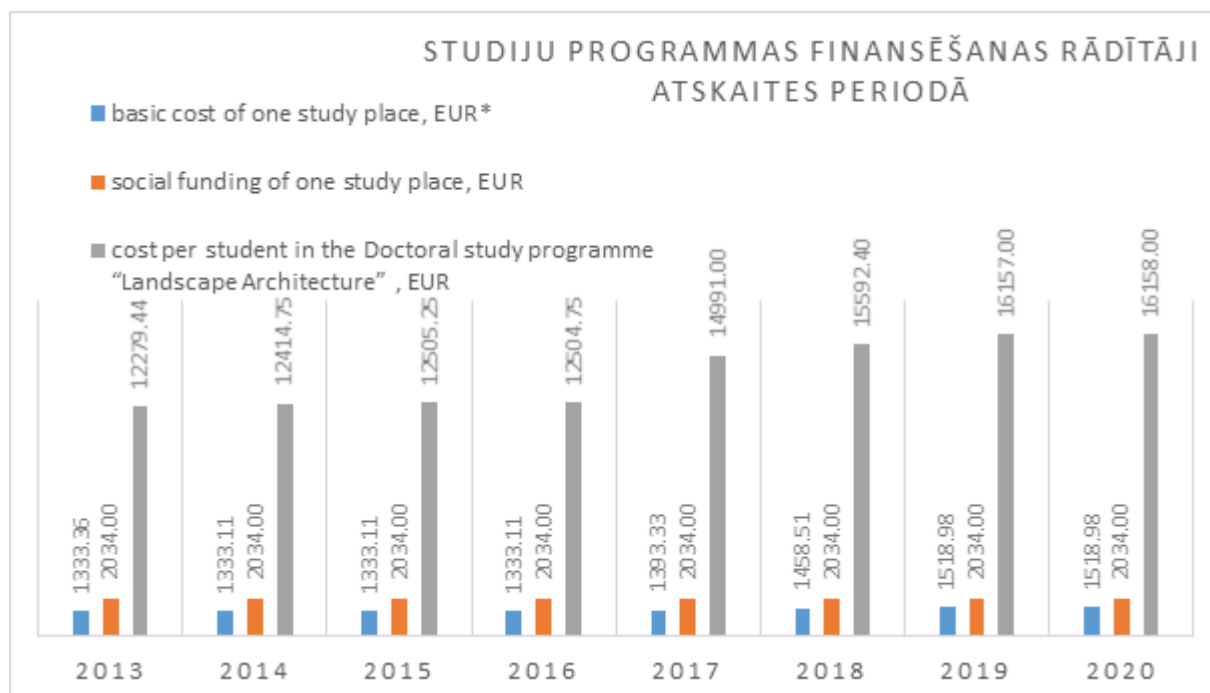


Fig. 2 State funding per study place in the PhD study programme Landscape Architecture

* Cost per student slightly differ at the same basic data (the basic cost of one study place and the social funding of one study place) in 2014, 2015 and 2016, and 2019 and 2020, because every year the provision of the study coefficient is provided in % with some decimals and may be slightly different. Rounding up, this provision is 100%, but, in figures in the contract in 2020 it was - 99.98242%, in 2019 - 99.97517%. Similar situation was in 2016, 2015 and 2014, when the provision was 85%, but in figures in the contract in 2016 - 84.45564%, in 2015 - 84.46058%, in 2014 - 83.7295803%

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the PhD study program "Landscape Architecture" consisted of:

- Remuneration - 71%

- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Additional financial support opportunities for students in the programme

State scholarships in the doctoral study programme amount to 113.83 EUR per month in doctoral studies, which are awarded to 3 doctoral students in one study year. This support is not sufficient for a full-fledged research, therefore, in the recent years, the LLU has started work on the creation of a new doctoral model. Starting from 2021, a new support programme has been launched, which allows doctoral students to apply for a grant for the performance of research within the framework of the project “LLU Transition to the New Model for Funding Doctoral Studies” (No. 8.2.2.0/20/I/001). At the same time, since 2018 LLU doctoral students and degree applicants have the opportunity to receive a grant from the LLU programme “Strengthening Scientific Capacity of LLU” and “Basic Research at LLU”, where it is possible to apply for funding for research through a competition. 2 doctoral students of the programme have used this opportunity. As far as possible, financial support for participation in conferences and publication of research results is also provided from the funding of the Faculty of Environment and Civil Engineering.

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).

In ensuring the study process, there is also cooperation with **other universities** in Latvia in several directions:

Organization of conferences, review of scientific publication of the conferences:

- With **the Faculty of Engineering** of the LLU, reviewing scientific articles for the collection of articles of the International Scientific Conference “Engineering for Rural Development” as well as **the Science and Project Development Centre of the LLU**, reviewing articles for the collection of articles of the International Scientific Conference “Research for Rural Development”. Doctoral students prepare scientific publications for the collection of conference articles within the framework of the study course “Preparation of Scientific Articles” and present their research at the conference.
- Cooperation with **RTU Faculty of Architecture and Urban Planning** teaching staff in reviewing scientific articles for the publications of the scientific journal “Landscape Architecture and Art”, as well as working in the editorial team of the journal.
- Cooperation with **RISEBA, Faculty of Architecture and Design**, review of scientific articles for the scientific journal ADAMarts (Architecture, Design and Audiovisual Media Arts, ISSN 2256-0890).

Research work

- Cooperation with **LLU Forest and Water Resources Scientific Laboratory, Forest Faculty** and **Faculty of Agriculture** in project implementation, development of scientific publications, research (Interreg Latvia - Lithuania cross-border cooperation projects, Latvia-Russia cross-border cooperation project).
- If necessary, other structural units of LLU may also participate in the supervision of individual doctoral thesis.

Thesis evaluation commissions

- cooperation with **RISEBA and RTU in the evaluation of final theses in the field of architecture.**

Participation in doctoral and professor councils

- cooperation with **RTU Faculty of Architecture and Urban Planning**. Representatives of both universities are members of the joint RTU and LLU Architecture Professors' Council, RTU Architecture Promotion Council and LLU Landscape Architecture Promotion Council.

Cooperation between foreign universities and teaching staff

- Cooperation with the **Estonian University of Life Sciences (EMU)** in organizing guest lectures, workshops, consultations, supervising doctoral theses, reviewing scientific articles, assessment of the study programme in the course of the ESF project "Improvement of governance of LLU" (No. 8.2.3.0/18/A/009) implemented by the LLU. Doctoral thesis of the Doctoral Programme in Landscape Architecture of the LLU in the Doctoral Council in Tartu.
- Cooperation with **the Department of Urban Planning at Vilnius Gediminas Technical University**. Review of scientific articles for the scientific collection of articles "Science – Future of Lithuania" (www.mla.vgtu.lt, ISSN 2029-2341 print / ISSN 2029-2252 online).
- Cooperation in research and review of scientific articles with the professionals of the **University of Agriculture of Sweden, St. Petersburg State Forest Technical University, Neubrandenburg**
- Cooperation with **Neubrandenburg** University in the work of the doctoral council and review of doctoral theses.
- Cooperation with honorary doctor of the LLU, **Professor Karsten Jørgensen from the Norwegian University of Life Sciences**. Review of scientific articles for the scientific journal "Landscape Architecture and Art" (http://llufb.llu.lv/Raksti/Landscape_Architecture_Art/index.html, ISSN 2255-8632 print / ISSN 2255-8640 online).
- Cooperation with the University of Applied Sciences in Haame and the Norwegian University of Life Sciences in organising BOVA intensive courses for doctoral students and teaching staff.
- Cooperation with the doctoral study programme of the **Department of Architecture and Construction of Kaunas Technical University** in organizing cooperation both in the review of scientific papers and the work of the teaching staff of the doctoral programme of the LLU at the Doctoral Council in Kaunas.

Cooperation with the University of Agricultural Science of Sweden, both in the review of scientific papers and the doctoral thesis, and the work of the academic staff of the LLU doctoral programme in the Doctoral Council SLU. In 2016, within the framework of the project "Increasing the capacity of electronic materials on climate change in rural areas" (Agreement No. 2/EEALV02/14/GS/062/002), a training seminar "Climate change processes in rural areas" Landscape planning, experience and solutions" took place in Valdeka castle, with the participation of a visiting professor from the SLU, who focused on a topical issue – the protection of agricultural lands with the expansion of settlement areas.

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, there are 14 lecturers implementing the doctoral programme - 6 professors and leading researchers, 1 professor (Emeritus), 1 associate professor and leading researcher, 6 docents, 2 of whom are leading researchers and 3 researchers. **97% of teaching staff are elected academic staff, 4 - experts of the Latvian Council of Science in the field of landscape architecture.** Such composition of teaching staff allows to provide an **independent doctoral council of the LLU in the Sub-field of Landscape Architecture** and to form a **joint council of professors with the Riga Technical University**, which ensures elections in the positions of professors and associate professors. Not all teaching staff are involved in the study process every year, because there are separate teaching staff who only supervise doctoral theses. Therefore, if in a given year the teaching staff does not supervise the development of the doctoral thesis, then he or she is not included in the total workload of the academic staff implementing the doctoral programme. The staff actively involved in the implementation of the programme has a capacity of 0,6 positions of an average of 8 teaching staff each year.

Since 2013, there have been **significant changes in the composition of the involved academic staff**, mainly related to doctoral degrees obtained by several teaching staff during the reference period and joining the programme implementation efforts. In total, since 2010, 6 new Doctors have been attracted to the sub-field of landscape architecture, including 4 in the reference period, and the renewal and succession of academic staff of the field is taking place. Currently, 60% of the teaching staff involved in the programme are under the age of 45. In addition, the academic staff members have been promoted (2 have become professors from docents, 1 - from docent to an assistant professor, 2 - from lecturers to docents), which confirms their active research work, development of scientific publications and academic work. They regularly transfer their knowledge to students, working with them in classes, in research and in the development of their final theses, as well as develop the research environment at LLU and cooperate in research with industry organizations and entrepreneurs.

Taking into account the specific direction, uniqueness of landscape architecture and its relatively narrow niche in higher education of Latvia, **guest lecturers from foreign universities** are invited to ensure the inclusion of the latest industry insights and current issues in the doctoral study process. For example, in 2013/2014 guest lecturers S.Bell (England) and M.Gelduff (Belgium) read lectures on research methods related to the topics of doctoral theses to be defended in 2013/2014. In order to develop broader international cooperation by inviting guest lecturers and share experience, the Department of Landscape Architecture and Planning has organised intensive training courses for doctoral students and teaching staff during the reporting period within the framework of the BOVA (Baltic Forestry, Veterinary and Agricultural University Network) programme: For example, in the 2017/2018 academic year, guest professors from the Norwegian University of Life Sciences were involved in the BOVA courses for doctoral students and the academic staff. Every academic year, as far as possible, foreign guest lecturers are engaged on the base of an employment contract, also from the own resources (tuition fees) of the Faculty of Environment and Civil Engineering. For example, in the study year 2016/2017, 1 visiting professor from the Swedish University of Agricultural Sciences and 1 visiting professor from the Estonian University of Life Sciences taught here. Since the 2016/2017 academic year, close cooperation has been established with Professor Simon Bell of the Estonian University of Life Sciences and the University of Edinburgh (H-index in Scopus 20). Cooperation with Professor S.Bell is very important because he has been involved in important projects, which are also related to the study of Latvian

landscapes, as well as several current issues. The professor has been president of the Council of European Schools of Landscape Architecture (ECLAS), thus also strengthening the international recognition of the speciality of landscape architecture at the LLU and cooperation with foreign landscape architecture schools. The professor acted as the second supervisor of a doctoral thesis at LLU, which was successfully defended in the academic year of 2019/2020.

The changes in the composition of the academic staff implemented during the reporting period have had a positive impact on the quality of studies, the content of study courses and the diversity of topics of doctoral thesis. Academic staff with a doctoral degree were actively involved in research projects, which allowed to involve doctoral students in research (see *Section 2.5 of the study program report* on the topics of final theses).

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.

A total of 14 teaching staff participate in the implementation of the study programme, all with a doctoral degree, - 6 professors, 1 professor (Emeritus), 1 associate professor, 6 docents. **4 are experts of the Latvian Council of Science** in the sub-field of landscape architecture **which conform to the requirements laid down in the Law on Higher Education Institutions for academic staff** in order to be able to implement the academic doctoral study programme.

The specifics of the supervised study courses correspond to the field of research of the teaching staff. Supervisors of doctoral theses work on the same or related sub-discipline topics that the doctoral student is researching. Also, the work of doctoral dissertation supervisors in contract work with industry companies and in research projects, involving also doctoral and Master's students in their implementation, promotes the development of a better understanding of the current needs and trends of the industry. Supervisors of doctoral theses involve their doctoral students in scientific projects. The experience gained in projects and research, which is transferred by lecturers to doctoral students, ensures the implementation of research on a scientific basis developed for years, increasing their scientific quality.

Table 2

The study programmes compliance with implementation conditions and requirements of regulatory enactments

Requirements	Compliance
The knowledge of the state language of the teaching staff involved in the implementation of the study programme complies with the regulations regarding the scope of knowledge of the state language and the procedure for testing the state language proficiency for the performance of professional and official duties.	has been ensured

The English language skills of the teaching staff involved in the implementation of study programmes taught in English correspond to at least Level B2 (<i>Section 55 of the Law on Higher Education Institutions</i>).	has been ensured
Not less than five persons with a doctoral degree shall participate in the implementation of the academic doctoral study programme, at least three of whom are experts approved by the Latvian Council of Science in the relevant field. (<i>Section 55 of the Law on Higher Education Institutions</i>)	14 persons with doctoral degrees and 4 experts from the Latvian Council of Science in the sub-field of landscape architecture participate

In the reporting period, **the teaching staff participated in the following activities that raised their academic and research qualifications:**

- English language courses organised by LLU (regularly) as well as within the framework of the project “Improvement of academic staff of LLU” (No. 8.2.2.0/18/A/014);
- University didactics courses attended by all elected lecturers (regularly);
- On LLU e-platforms - Moodle environment training courses for lecturers (regularly);
- Professional development courses such as specialised courses in ArcGIS, AutoCAD, SkechUp, as well as courses to improve professional qualification within the framework of the project “Improvement of academic staff of LLU” (No. 8.2.2.0/18/A/014), such as “Online tools for creating and communicating interactive presentations and creating surveys online”, “Dynamic and active presentation”, “MS Cloud services for data storage and sharing” (2020);
- Intensive courses for doctoral students and teaching staff “Academic Writing for Landscape Architects”, BOVA, LLU (2017);
- Internships in enterprises within the framework of the project “Improvement of academic staff of LLU” (No. 8.2.2.0/18/A/014), acquiring new skills and getting acquainted with the current problems of the sector.

Research and academic activities of the programme's teaching staff allow active participation in different councils. 6 members of the teaching staff are experts of the Latvian Council of Science (4 in the sub-field of science – landscape architecture), 4 are members of the Latvian Academy of Agriculture and Forest Sciences, 2 are members of the joint Council of Professors of the Architecture Sector of the LLU and RTU.

Lecturers involved in the programme, **are also invited to give lectures to the industry**, participate in projects implemented by ministries or other institutions **as experts**, and give lectures on topics related to the industry - at least 10-15 different lectures each year. The teaching staff also participate as **experts in various commissions**, for example, the jury of the Best Building of the Year, commissions of various design competitions (Salaspils, Bauska etc.) etc.

In order to increase their qualification, improve their English language skills, make new contacts for scientific and study process, as well as improve the study programme, the teaching staff goes **to read lectures and exchange experiences within the ERASMUS+ programme**. Every year at least 4-6 people from the teaching staff of the department go on exchange programmes. In 2019/2020, mobility and exchanges were not possible due to the pandemic.

The qualification and contribution of the teaching staff is also noticed by the industry, the state and local governments, presenting the teachers with **awards, letters of commendation and gratitude**. Latvian and international awards and recognitions received during the reporting period:

- Latvian Academy of Sciences, SIA ITERA LATVIJA and RTU Development Fund - seven awards received;
- Letters of Commendation from the Ministry of Agriculture of the Republic of Latvia - 2 Letters of Commendation received;
- European Academy of Sciences and Arts and Latvian Academy of Sciences Award for Young Scientists (Felix Award);
- Award of the European Council of Landscape Architecture Schools ECLAS;
- Award for the competition "Woman in Architecture and Construction";
- "Zemgales Laiks Ziedonim" for contribution to the development of Zemgale region - three awards received;
- Recognition of LLU textbooks and study materials;
- Awards of various competition commissions related to plein airs - at least 10 awards;
- Letter of commendation "Volunteer of the Year" for volunteer work in the activities of the Big Cleanup.

International industry organizations and networks where the teaching staff of the department participate:

- **IFLA** - International Federation for Landscape Architecture;
- **ECLAS** - European Council of Landscape Architecture Schools;
- **ELASA** - European Landscape Architecture Schools Association;
- **EBANELAS** - Eastern Baltic Network of Landscape Architecture Schools;
- **NORDNATUR** network;
- **ICOMOS** (International council of monuments and sites);
- **Nordic Landscape Research** network;
- **Herity** network (International Cultural Heritage Quality Management Assessment);
- **NJF** - Nordic Association of Agricultural Scientists.

In Latvia, the teaching staff work in the following **Latvian- level commissions**:

- Competition "Best Building of the Year" expert commission;
- Riga City Monuments Council;
- Council of Construction Industry Experts;
- Zemgale Regional Student Research Conference - Commission of Expert Evaluation of Competition Papers (every year);
- LAAA Landscape Architecture Industry Certification Commission (regularly);
- Latvian School of Architecture Plein Air Steering Committee (every year);
- ITERA Latvia Scholarship Commission (every year);
- Jelgava City Agency "Culture" Jury Commission at the Sand Sculpture and Ice Sculpture Festivals (every year);
- RTU Faculty of Architecture Geniator XIV (during the event).

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 publications of teaching staff of the doctoral programme Landscape Architecture can be divided into two parts, according to the study courses implemented in the programme. One block consists of **general research methodology courses** (*Foreign language special course (English), Latvian I and II (for international students), Research methodology, Preparation of scientific articles*), and the other - study courses related to the scientific sub-direction of landscape architecture (*Research methodology in landscape architecture, Theoretical studies in the sub-field of science, special Course of the research direction*).

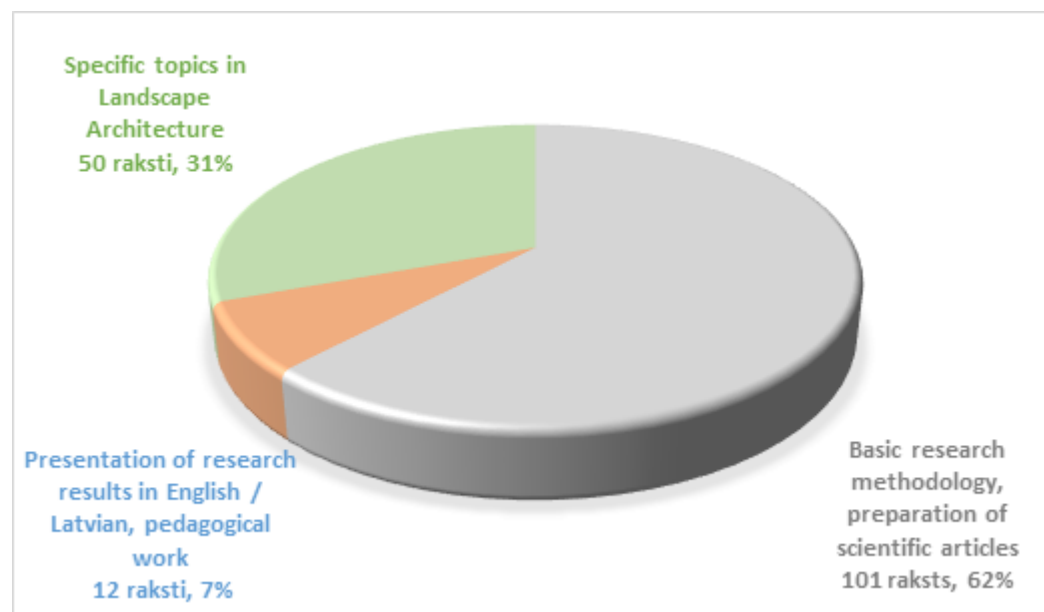


Fig. 3 The thematic groups of the publication of the teaching staff involved in the programme in Scopus and Web of Science.

The total number of the publications of the 14 members of the teaching staff involved in the programme during the reporting period is 257, including 162 publications (or 11.6 per 1 teaching staff member) indexed in the Scopus and Web of Science databases. The Figure 3 shows the breakdown of the thematic groups of the publication of the teaching staff involved in the programme in Scopus and Web of Science. A more detailed breakdown of publication types is provided in Table 3 and Figure 4.

Table 3

Publication types

Publication type	Number
International, peer-reviewed scientific publications included in Web of Science or Scopus scientific literature databases	162
Publications in anonymously-reviewed international scientific journals, incl. proceedings	65
Popular science and scientifically-methodical publications	17
Abstracts and other publications, publications, doctoral theses	13
Total	257

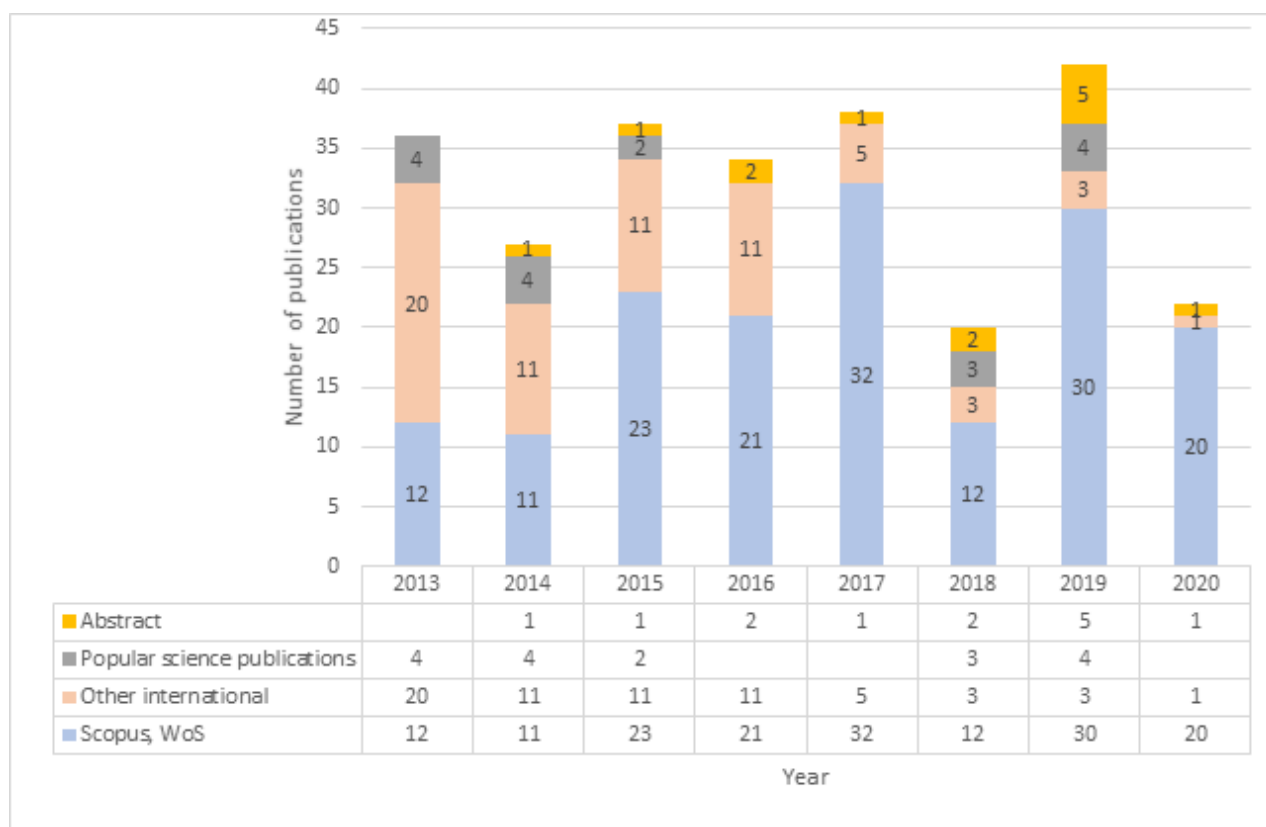


Fig. 4 Number and distribution of publications of the programme's teaching staff (all) by year

The general research methodology section is represented by teaching staff from fields widely represented in science, thus, this section represents a large number of publications indexed in the Scopus and Web of Science databases. The subsector of landscape architecture is relatively narrow, therefore, the possibilities of publishing in scientific journals indexed by Scopus and Web of Science are limited. This was also one of the reasons why in 2012 the **LLU scientific** journal Landscape Architecture and Art was created, in which the articles included from 2016 are regularly indexed in Scopus, Web of Science and other databases. Currently, the magazine is the only international, scientific journal in the field of landscape architecture in the Baltics, which is indexed in the Scopus and Web of Science database and where the articles are freely accessible, including by doctoral students in the programme, as well as the students of the Bachelor's and Master's programmes. The fact that the subsectors of landscape architecture are specific and not widely represented in scientific journals is also evidenced by the fact that the publications drawn up at the beginning of the reference period were mainly published for international conference publications, which were mostly not indexed in databases. As the possibilities for publication grew, so did the number of the indexed publications. **The number of publications by teaching staff representing landscape architecture** is shown in Figure 5.

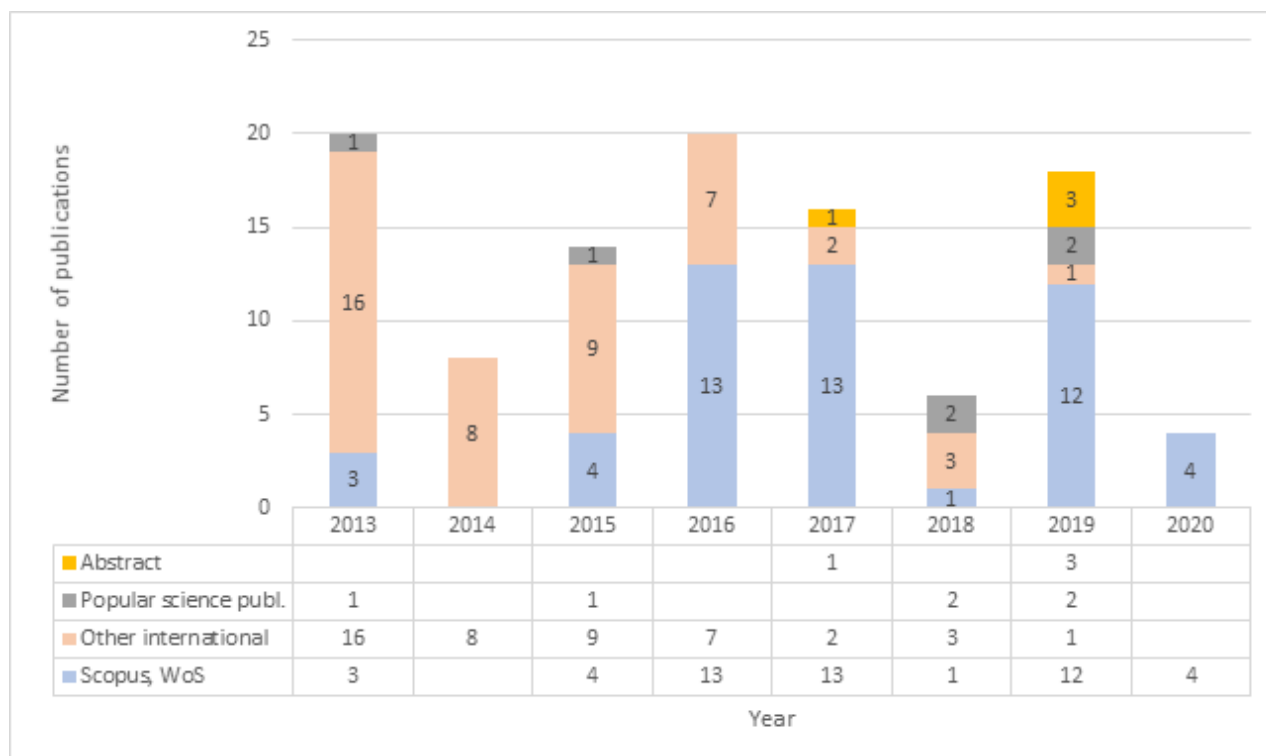


Fig. 5 Number and breakdown of publications in landscape architecture subsector by year

The **number of publications prepared by teaching staff is influenced by several aspects:**

- Research projects implemented which contribute to the development of publications
- Opportunities to participate in international, scientific conferences and publish articles in conference collections
- Financial support (grants, specific programmes, etc.)
- Academic workload.

Evaluating the number of prepared sectoral publications, a marked drop was observed in 2018, when changes in the Master's and Bachelor's study programmes were introduced and initiated, which required significant resources for the development of the programme materials and implementation of new approaches. The drop in 2020 is related to the limited opportunities caused by the COVID-19 pandemic to participate in international conferences, including the publication of articles in conference collections, as well as the increased academic workload, as it was necessary to review and modify study materials by adapting them to remote learning.

The topics of landscape architecture articles reflect the research interests and current topics of the teaching staff of the Department of Landscape Architecture and Planning involved in the programme, which are subsequently encouraged to continue in their doctoral thesis. The themes are also in line with the industry's current strategies described in *Section 2.1*.

The main themes of the landscape architecture subsector are as follows (Fig.6.):

- Quality of living environment and socialisation, urban public outdoor space, residential courtyards (24%)
- Cultural and historical heritage in rural and urban landscape (22%)
- Research and academic methods in the field of landscape architecture and planning, digital tools (12%)
- Green infrastructure, interaction of ecology and aesthetics, design adapted to climate change (12%)
- Landscape perception, identity, landscape aesthetics (10%)

- Road landscape perception and planning / public street outdoor space (10%)
- Landscape planning and management in the context of the implementation of the European Landscape Convention (6%)
- Specific themes (rehabilitation gardens, sacral landscape, coastal landscape) (4%).

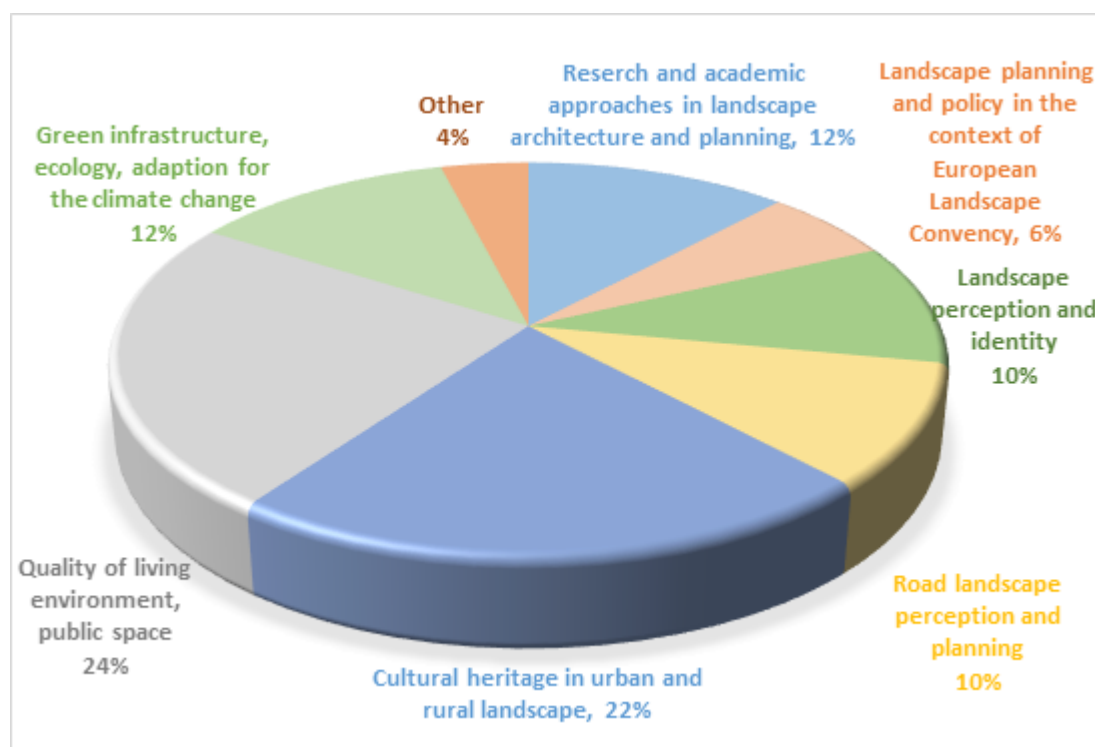


Fig. 6 Distribution of landscape architecture themes in Scopus and Web of Science publications

The full list of publications indexed on Scopus and Web of Science and the thematic breakdown of publications are attached in the *Appendix 5*.

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).

In accordance with Decision No. 10 -70 of 11.03.2020 of the Senate of the LLU, the academic work in the LLU includes not only pedagogical work, but also research and quality assurance work of the study process. The academic staff, leading researchers, researchers and scientific assistants provide information about their scientific activities each year and receive an assessment according to the current criteria set by the Scientific Council of the LLU.

The involvement of the academic staff of the programme in research is related to the priority directions identified in the development strategy of the LLU for 2015-2022. In the field of landscape architecture, it is the “*Research and development of urban and rural landscape*” with the aim to identify, preserve, develop and manage the value of the Latvian cultural landscape, including the urban and rural environment, as an essential component of national identity.

According to this direction, **academic staff members are involved in the following research activities** (*Table 4*):

- Research projects funded by the European Union
- EEA-funded research and academic projects
- Publicly funded projects (National Research Programme, Ministry of Agriculture and Ministry of Environmental Protection and Regional Development projects, Rural Support Service projects, etc.)
- Contract research for companies, municipalities and other institutions
- LLU internal research projects

Undergraduate, Master's and doctoral students in landscape architecture are often involved in the implementation of projects for the performance of research work.

Table 4

Involvement of academic staff in research projects

Title of the project	Implementation period	Funding		Number of academic staff involved	Participation type
		Source	EUR		
International projects, projects of the European Economic Area Financial Instrument Program					
Interreg Latvia-Lithuania Programme "Sustainable Integration of Novel Solutions into Cultural Heritage Sites/ NovelForHeritage" http://www.vbf.ltu.lv/lv/jaunu-ilgtspejigu-risinajumu-integracija-kulturas-mantojuma-sustainable-integration-of-novel (in Latvian)	1.07.2020. - 30.06.2022.	European Regional Development Fund (ERDF), The Ministry of Environmental Protection and Regional Development (VARAM)	851 016,93	2 (also one doctoral student and several master students were involved)	Project leader of sub-direction of the project, researchers
Interreg Baltic Sea Region project "Water driven rural development in the Baltic Sea Region" (WATERDRIVE) https://water-drive.eu/about/ https://www.ltu.lv/lv/WATERDRIVE (in Latvian)	1.01.2019. - 30.06.2021.	ERDF, VARAM	2 711 587,46	1	researcher
Interreg Latvia-Lithuania Programme 2014-2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions" (BrownReg). http://www.vbf.ltu.lv/lv/innovative-brownfield-regeneration-for-sustainable-development-of-cross-border-regions-brownreg (in Latvian)	1.03.2018. - 30.11.2019.	ERDF, VARAM	753 748,03	4 (also one doctoral student and several master students were involved)	Project leader, experts
Latvian-Russian Cross-border Cooperation Program 2014-2020 project "Sustainable Use of Water Resources for Tourism Development in Latvian-Russian Border Towns - Rezekne and Ostrov" (LV-RU-017) Urban Sticky Areas. Project implementation period: 2019-2021. Students participate in project activities http://www.vbf.ltu.lv/lv/udens-resursu-ilgtspejiga-izmantosana-turisma-attistibai-latvijas-krievijas-robezpilsetas-rezekne (in Latvian)	6.01.2019. - 31.12.2021.	ESF, State funding, Funding of Russian Federation	621 021,77	3 (also one doctoral student and several bachelor students were involved)	Project leader of sub-direction of the project, experts
Interreg Latvia-Lithuania Programme 2014-2020 project „Creation of Joint GI Education to Increase Job Opportunities in the Region" (No. LLI-206). Project implementation period: 2017-2020. http://gisedu.eu/en	01.04.2016. - 30.06.2019	VARAM, ERDF	363 468,28	2 (also one doctoral student and several bachelor students were involved)	experts
Project of the European Economic Area Financial Instrument Program "National Climate Policy" "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" (agreement No.2 / EEZLV02 / 14 / GS / 062/002) http://www.eklimats.lv/index.php/lv/ (in Latvian)	01.01.2011. - 31.12.2013.	The State Education Development Agency (VIAA) + LLU	103 004,56	5 (also one doctoral student and several bachelor students were involved)	experts
State projects (State Research programme, projects of the ministries of Agriculture and Environmental Protection and Regional Development, Rural Support Service of Latvia etc.)					

Title of the project	Implementation period	Funding		Number of academic staff involved	Participation type
		Source	EUR		
Research project of the State Research Program "Sustainable Spatial Development and Rational Use of Land Resources" (No. VPP-VARAM-ITAZRI-2020 / 1-0002) "Sustainable land resource and landscape management: challenges, development scenarios and proposals" (LandLat4Pol). https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2020/ilgtspejiga-zemes-resursu-un-ainavu-parvaldiba-izaicinajumu (in Latvian)	01.12.2020. - 30.11.2022.	VARAM, State funding	376 550,00	7 (also one doctoral student and several master students were involved)	Project leader of sub-direction of the project, researchers
Development of new composite materials based on foam gypsum with fiber reinforcement and research of systems made from them Nr.2010/0320/2DP/2.1.1.1.0/10/APIA/VIAA/107	01.01.2011. - 31.12.2013.	The State Education Development Agency (VIAA)	533 576,93	2	researchers
Projects from the industry, municipalities and other institutions					
A thematic plan "Concept of Daugava river landscape in Aizkraukle"	1.01.2019. - 31.08.2019.	Aizkraukle Municipality Council	4 235,00	2	experts
A concept for the development of greenery and facilities for the territory of the Pauls Stradiņš' Clinical University Hospital	1.01.2019. - 31.08.2019.	VSIA „Paula Stradiņa Klīniskā universitātes slimnīca	8 200,00	3	experts
The thematic plan "Landscape concept for Ikšķile city and villages"	1.05.2018. - 30.11.2018.	Ikšķile Municipality Council	8 107,00	3	experts
Projects of LLU research programs					
LLU program "Strengthening the scientific capacity of LLU" project "Industrial heritage landscape on the Western coast of the Baltic Sea in Latvia", agreement No. 3.2.-8/58 https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2017/industria-la-mantojuma-ainavtelpa-baltijas-juras-rietumu (in Latvian)	10.05.2017. - 9.05.2019.	LLU, State funding	6 220,00	1 (one doctoral student also was involved)	Project leader
LLU programme "Strengthening of scientific capacity at LLU" project "Road landscape modeling", agreement No. 3.2.-10/50. https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2017/cela-ainavas-modelesana (in Latvian)	1.01.2017. - 31.12.2018.	LLU, State funding	8 000,00	2 (one doctoral student also was involved)	Project leader, researchers

The thematic areas of the projects cover **the topicalities and strategic initiatives of the sector** described in *Section 2.1*, as well as the **priority research directions** defined and implemented in the **LLU development strategy 2015-2022** and set by the **Department of Landscape Architecture and Planning**. The thematic areas of the projects implemented include:

- Sustainable development and management of Latvia's landscapes and land resources
- Green infrastructure and establishment of a greenery structure appropriate to the climate conditions and identity of the site, public participation
- Adaptive to climate change solutions for rural and urban areas
- Integrated management of natural resources for tourism development and sustainable spatial planning
- Protection and revitalisation of cultural heritage
- Remediation and sustainable development of degraded areas
- Road landscape planning and human perception studies
- Use of digital tools in landscape research, planning and management.

All teaching staff involved in the programme have work experience in research projects, which allows **to include the project results** and the acquired key findings **in study courses of landscape architecture at all levels**, as well as **to involve students in the project activities**.

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 programme's teaching staff and doctoral students have been involved in a number of **projects that contributed to:**

- strengthening the scientific capacity and strengthening the department's research areas;
- promoting international recognition by cooperating with foreign scientific institutions by publishing research results in international journals and presenting them at conferences;
- the availability of the necessary resources for the implementation of studies and science;
- the improvement of study programmes;
- the involvement of students in research.

The programme involves teaching staff from different fields, but in the context of the development of the study programme, only projects in the scope of landscape architecture are reviewed, linking them to the study process (Table 5).

Table 5

Involvement of academic staff in research activities and their linkage to the study process

Implemented projects	Linking the results of the programme and the application of information in the study process
Latvian State projects	
Research project of the State Research Program "Sustainable Spatial Development and Rational Use of Land Resources" (No. VPP-VARAM-ITAZRI-2020 / 1-0002) " Sustainable land resource and landscape management: challenges, development scenarios and proposals " (LandLat4Pol). Project implementation: 01.12.2020 - 30.11.2022 https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2020/ilgtspējiga-zemes-resursu-un-ainavu-parvaldiba-izacinajumu (in Latvian)	<p>The project is an important contribution in the field of landscape research in Latvia, as it envisages to develop an integrated landscape assessment and mapping method, digital landscape atlas, for the first time in Latvia. The results of the project will contribute to landscape management in Latvia in the context of the implementation of the European Landscape Convention.</p> <p>The project involves all teaching staff in the landscape architecture subsector of the programme, as well as one doctoral student. The doctoral student will analyse the approach of ecosystem services within the framework of landscape assessment.</p> <p>The project results are intended to be published in international scientific journals and presented to the scientific audience and other interested parties. In the course of the project, also a monograph will be developed on research methods in landscape assessment, which will make a significant contribution not only to the methodological framework of the programme, but also to the sector as a whole. The project is also an important contribution to improving the qualifications and experience of teaching staff, promoting cooperation between the LLU, the scientific institutions involved in the project and other stakeholders.</p>
International projects	

Implemented projects	Linking the results of the programme and the application of information in the study process
<p>Interreg Latvia-Lithuania Programme “Sustainable Integration of Novel Solutions into Cultural Heritage Sites/ NovelForHeritage” http://www.vbf.ltu.lv/iv/jaunu-ilgtspejigu-risinajumu-integracija-kulturas-mantojuma-sustainable-integration-of-novel (in Latvian)</p>	<p>The project echoes one of the programme's thematic areas related to the cultural and historical landscape. Within the framework of the project, the attractiveness of Eleja manor park and Žagare manor park for tourists will be increased. Both parks have been designed by landscape architect and gardener G.Kūfalts, who, at the turn of the 19th-20th centuries, was known throughout Europe. The involvement of the Latvia University of Life Sciences and Technologies and the Lithuanian Natural Heritage Foundation in the project will provide a scientific and practical approach that will be of interest to landscape architects.</p> <p>The teaching staff of the programme conducts research on the cultural and historical landscape, in cooperation with Lithuanian colleagues, the obtained materials will supplement the methodological base of the study programme. The project involves one doctoral student.</p>
<p>Interreg Baltic Sea Region project “Water driven rural development in the Baltic Sea Region” (WATERDRIVE) https://water-drive.eu/about/ https://www.ltu.lv/iv/WATERDRIVE</p>	<p>The theme of the project is closely linked to the thematic areas of the programme, which relate to the sustainable development of areas integrating natural resources. The project brings together several Latvian and foreign scientific institutions, which allows to share experience and promotes access to information. It also promotes public involvement in various approaches to address and inform, as well as introduces new and smart management measures on agricultural land. Spatial planning to control the risks of climate change - droughts and floods in downstream agricultural areas - a new risk mitigation system. Within the framework of the project, the task in this activity is to use the assessment of ecosystem services for the assessment of river basin territories, involving the population, as a case study method.</p> <p>In this project, there is cooperation between several departments and scientists both within LLU and at the international level. The results of the project will significantly complement the methodological basis of the programme.</p>
<p>Interreg Latvia-Lithuania Programme 2014-2020 project „Creation of Joint GI Education to Increase Job Opportunities in the Region” (No. LLI-206). Project implementation period: 2017-2020. http://gisedu.eu/en</p>	<p>A cross-border cooperation project involving the acquisition of the ArcGIS software for use in landscape research, planning and management. The results of the project support doctoral students in using various digital tools in their research. ArcGIS software is also a good support for doctoral students in obtaining research data.</p>

Implemented projects	Linking the results of the programme and the application of information in the study process
<p>Interreg Latvia-Lithuania Programme 2014-2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions” (BrownReg). Project experts from VBF Departments of Land Management and Geodesy, Environment and Water Management, Landscape Architecture and Planning, Forest Faculty and Faculty of Agriculture. Implementation period 1.03.2018 - 31.08.2019 Project leading partner - LLU, partners - Ludza municipality (LV), Ignalina and Kupiškis municipalities (LT).</p> <p>http://www.vbf.llu.lv/lv/innovative-brownfield-regeneration-for-sustainable-development-of-cross-border-regions-brownreg (in Latvian)</p>	<p>The project is closely linked to the thematic areas of the doctoral programme, which deals with the principles of sustainable landscape development and the introduction of innovative technologies. Within the framework of the project, a study on the possibilities of revitalization of former industrial territories has been practically implemented, creating plantations of phytoeremiation plants and developing possible development scenarios in 3D. The project has implemented interdisciplinary cooperation between landscape architects, land management specialists, environmental engineers, biodiversity specialists.</p> <p>The main activities of the project included: gathering, implementing and popularizing new knowledge for innovative revitalization of degraded territories, in cooperation with the university and municipalities developing a good practice guide for municipal spatial planners, industry professionals and the public; 3D modelling, site remediation and installation and monitoring of phytoeremiation pilot sites for remediation of contaminated soils in degraded areas in Ludza, Ignalina and Kupiškis; public involvement in cleaning up the territories. Based on the promotion of cooperation between scientists and municipalities, the project results provide an important practical, scientific and informative basis for innovative, environmentally friendly brownfield revitalization approaches that can be used for future projects of revitalization of degraded areas and in the study process. The project involved a doctoral student and Master's students. The results of the project complement the methodological basis of the programme.</p>
<p>Latvian-Russian Cross-border Cooperation Program 2014-2020 project "Sustainable Use of Water Resources for Tourism Development in Latvian-Russian Border Towns - Rezekne and Ostrov" (LV-RU-017) Urban Sticky Areas. Project implementation period: 2019-2021. Students participate in project activities</p> <p>http://www.vbf.llu.lv/lv/udens-resursu-ilgtspējīga-izmantosana-turisma-attīstībai-latvijas-krievijas-robezpilsetas-rezekne (in Latvian)</p>	<p>The theme of the project is in line with the programme's research directions related to integrated planning of natural resources in urban environments. The theme also relates to adaptation to climate change and the development of sustainable areas.</p> <p>The project partners will develop research on water basins in Rēzekne and Ostrov, create materials for sustainable waterfront tourism routes. An integrated handbook on natural resource management and a common cross-border approach to the integrated natural resources management study process will be developed.</p> <p>The project involves a doctoral student, Bachelor's and Master's students. The results of the project will improve the methodological basis of the programme.</p>
<p>In connection with the Latvian Association of Landscape Architecture (LAAB), the following project is being implemented: Leonardo da Vinci exchange program for the independent professional development of landscape architects in the Baltic Sea region CPD-LA (No. LLP-LdV-TOI-2013-LT-0138-P2). Project period: 01.09.2013 - 01.09.2015 Partners involved: Vilnius Gediminas Technical University (Lithuania, VGTU), Lithuanian Association of Landscape Architects (Lithuania, LALA), Latvian Association of Landscape Architects (Latvia, LAAB), German Federation of Landscape Architects (Germany, BDLA).</p>	<p>An international project involving 4 partners and concerning:</p> <p>Training on quality assessment methods in landscape architecture and project management, as well as on the adaptation of methodological materials.</p> <p>Lessons were learned that had not been appreciated in the study programme until now. A project with a very high contribution to the development of the sector.</p> <p>This is a new direction of research for doctoral studies, especially working at an international level.</p>
<p>Eastern Baltic Network of Landscape Architecture Schools - a network of landscape architecture schools in the Baltic and Eastern European countries, which aims to compare study programmes between Latvian, Lithuanian, Estonian, Swedish, Norwegian universities and adapt them to the EFLA (European Federation of Landscape Architects) educational standard or landscape architecture.</p> <p>https://www.facebook.com/pg/Ebanelas-205603633183585/about/</p>	<p>Cooperation between landscape architecture schools in the Baltic Sea region provides an opportunity to increase the level of study quality. This also applies to the doctoral study programme.</p>

Implemented projects	Linking the results of the programme and the application of information in the study process
<p>Project of the European Economic Area Financial Instrument Program "National Climate Policy" "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" (agreement No.2 / EEZLV02 / 14 / GS / 062/002).</p>	<p>The overall aim of the project is to improve the availability of information on the effects of climate change and mitigation tools in rural areas. The overall direct goal is to develop high-quality electronic learning modules on climate change and mitigation tools in rural areas, thus improving the transfer of information from research to the study process. In this project, there was cooperation between several departments and scientists, students.</p>
Implemented contracts in cooperation with local governments	
<p>A thematic plan "Concept of Daugava river landscape in Aizkraukle" has been developed. Commissioning party - Aizkraukle Municipality Council.</p>	<p>Both lecturers and students are involved in the implementation of the project, working on the research of the territory, as well as the development of the development concept and gaining practical experience. The methods developed in the project strengthen the methodological basis of the doctoral programme.</p>
<p>A concept for the development of greenery and facilities for the territory has been developed for the Pauls Stradiņš' Clinical University Hospital. Commissioning authority - VSIA "Paula Stradiņa Klīniskā universitātes slimnīca";</p>	<p>The theme of the project includes both the quality of the public outdoor space and the creation of a rehabilitating landscape, which also echoes the research areas implemented in the programme. The teaching staff involved in the programme, carried out research work, obtaining additional materials for the implementation of study courses.</p>
<p>The thematic plan "Landscape concept for Ikšķile city and villages" has been developed. Commissioning party - Ikšķile Municipality Council.</p>	<p>The theme of the project covers both landscape assessment and planning and management issues, which are in line with the research directions of the programme. The teaching staff involved in the programme, carried out research work, obtaining additional materials for the implementation of study courses. The methods developed in the project strengthen the methodological basis of the doctoral programme.</p>
LLU programme projects	
<p>ESF project "Development of LLU academic staff" https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2019/llu-akademiska-personala-pilnveidosana (in Latvian)</p>	<p>During the project, in each of the study directions, the following has been implemented: internship of the academic staff with entrepreneurs in order to promote closer connection of the study process with the national economy and to increase the competence of the teaching staff; increased level of English language skills of the academic staff in order to promote the development of new study programmes, attract foreign students and increase professional performance; improved leadership and communication skills of the academic staff in order to ensure more efficient and modern study process, efficiency and quality of work performance; doctoral students are engaged to study direction in order to promote the implementation of human resources renewal and succession plans; foreign academic staff has been engaged to the study fields in order to more effectively ensure the achievement of the basic goals of the LLU and to approach its vision faster - to become one of the leading universities of science and technology in the Baltic Sea region.</p>
<p>ESF project "Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision." https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2017/llu-un-tas-parraudziba-esoso-zinatnisko-instituciju (in Latvian)</p>	<p>The aim of the project is to increase the scientific research and innovation capacity of LLU and the ability to attract external funding by investing in human resources and infrastructure. Within the project, high-performance computer classes equipped with appropriate software have been developed.</p>

Implemented projects	Linking the results of the programme and the application of information in the study process
<p>ESF project “Modernization of LLU STEM study programmes” https://www.llu.lv/projekti/apstiprinatie-projekti/2017/llu-stem-studiju-programmu-modernizacija (in Latvian)</p>	<p>During the project, the premises, auditoriums, computer classrooms and laboratories necessary for the implementation of STEM study programs will be repaired, equipped and modernized. The infrastructure of the Fundamental Library of the LLU has been improved and modernized. In order to improve the knowledge of students and lecturers and to achieve the results of the study programmes, the range of available literature with printed and e-books will be expanded. Modernization of the unified management LLU Wi-Fi network will be performed, including software renewal, expansion of Blade type server park with server software to ensure study process, expansion of disk array capacity for information storage and circulation, LLU network equipment, network functionality expansion, purchase of antivirus software, extension of firewall software functionality, emergency generator power supply solution for data center.</p>
<p>ESF project No. 8.2.3.0/18/A/009 “Improvement of the Management of Latvia University of Life Sciences and Technologies” https://www.llu.lv/projekti/apstiprinatie-projekti/2018/latvijas-lauksaimniecibas-universitates-parvaldibas-pilnveide (in Latvian)</p>	<p>The aim of the project is to improve the quality of the content of LLU study programmes and, using the available resources effectively, to ensure better management of the higher education institution and increase of competencies and skills of the management staff.</p> <p>Within the framework of the project, the content of the existing study programmes was improved and adjusted to the needs of the development of the field; evaluation and improvement of the functions of the organizational and management structures of the university; improvement of the university quality management system; development, improvement and implementation of e-solutions for management and internationalization needs; improvement of knowledge, skills and competencies of university management staff; international peer-review and updating of the change plan.</p>
<p>LLU programme “Strengthening of scientific capacity at LLU” project “Road landscape modeling”, agreement No. 3.2.-10/50.</p>	<p>The aim of the programme is to promote the development of the priority research directions defined in the LLU science development strategy and the development of appropriate doctoral theses.</p> <p>Within the framework of the programme, two doctoral researches are supported, which are important for the development of science and connection with the study process.</p>
<p>LLU program “Strengthening the scientific capacity of LLU” project “Industrial heritage landscape on the Western coast of the Baltic Sea in Latvia”, agreement No. 3.2.-8/58.</p>	<p>The research and doctoral thesis on road landscape perception and planning was defended in 2019. The young scientist continues his work in the Department of Landscape Architecture and Planning as an elected academic and scientific staff member.</p>

The academic staff of the programme regularly **publishes the results of the research work in scientific journals**, as well as presents reports **at international scientific conferences**. For example:

- ECLAS (European Council of Landscape Architecture Schools) annual conferences together with PhD colloquium in Oslo (2019), London (2017) Rapperswil (2016), Tartu (2015)
- IFLA (International Federation of Landscape Architects) World Congress in Oslo (2019), Singapore (2018);
- World Multidisciplinary Civil Engineering, Architecture, Urban Planning Symposium (WMCAUS) in Prague (2017, 2019),
- International conference ICON-LA in Sankt Peterburg (2017) etc.

Either the **academic staff participate in international industry organizations and networks**, that allows to identify topical issues and trends in the field of landscape architecture and planning, as well as to hear latest information from research projects implemented by the

foreign colleagues. The academic staff of the Programme participate in following organizations: International Federation for Landscape Architecture; European Council of Landscape Architecture Schools; European Landscape Architecture Schools Association; Eastern Baltic Network of Landscape Architecture Schools; NORDNATUR network, Nordic Landscape Research network, Herity network; Nordic Association of Agricultural Scientists etc.

The 4 members of the teaching staff of the programme are the **members of the Latvian Academy of Agriculture and Forest Sciences** (LLMZA). The quality of the professional and research work of the teaching staff is confirmed by their involvement as **experts in various commissions of state institutions of Latvia and industry organisations**, such as the Riga Monuments Council, the Jelgava City Council Aesthetics Commission, the Construction Industry Expert Council, the Latvian Landscape Architects Association (Chair, Members of the Board) and the Landscape Architects Certification Commission, the Latvian Architects' Union, etc.

The research experience of the programme's teaching staff and international cooperation provide an opportunity to actively participate in editorial boards of scientific journals and to act as reviewers, as well as participate in the organization of international scientific conferences, for example, international conferences "Research for Environment and Civil Engineering Development" (2013, 2015), ECLAS international conferences, the Second International Congress on Landscape Architecture Research (ICLAR), and in the editorial board of the scientific articles in the journal "Landscape Architecture and Art" 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 cooperation of the teaching staff takes place by working on the improvements of the programme, as well as **by cooperating in research and in the management and consulting of doctoral thesis topics**. The improvement of the programme is discussed in working group discussions and / or by communicating in the e-environment. Faculty members meet individually to discuss a specific topic or discuss topics in local seminars at a departmental and interdepartmental level. Cooperation between the teaching staff within the study program is mainly subordinated to the research topic of the doctoral student. The lecturers of the theoretical courses of the programme communicate with the supervisors of the doctoral thesis in order to specify the individual tasks in accordance with the topic of the doctoral thesis.

The cooperation between the teaching staff and exchange of views is best marked by the format of the doctoral exams. The exam is accepted by a commission with a minimum composition of 3 members of the teaching staff. The doctoral exam in the sub-field of theoretical studies is organised in the 3rd semester so that the doctoral student has already acquired prior knowledge in the research process in the field. Doctoral exam in the special course of the research direction is organized in the 5th semester, which provides an opportunity for the doctoral student to demonstrate the already compiled research and the competence already acquired in discussions with the academic staff. At the time of the exam, not only the current issue is presented, but also the exchange of scientific opinions between the commission/academic staff and the doctoral student. The format of doctoral examinations in the 3rd and 5th semester, clearly describes not

only the abilities of the doctoral student, but also the contribution of the academic staff that has/has not ensured the necessary level of interdependence between the academic staff for the promotion of the research work. Cooperation between the teaching staff of the programme also takes place within the framework of various study courses involving more than one teaching staff member of the programme.

The majority (97%) of the academic staff is elected staff, which ensures staff stability. 14 people are involved in the implementation of the study programme, who realize 0.6 full-time positions, implementing the programme. **The ratio of the number of students to the number of academic posts** is 6.7, which is lower than the LLU average (13.2) due to the specific nature of the programme (implemented only by lecturers with a doctoral degree, relatively smaller number of classes, more individual independent research work and consultation with the scientific supervisor).

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	1_appendix_statistics_ENG.pdf	1_pielikums_statistika_LV.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	4_appendix_AA_DOK_mapping_study_courses_ENG.pdf	4_pielikums_AA_DOK_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	2_appendix_study_plans.rar	2_piel_studiju_plani.rar
Descriptions of the study courses/ modules	3_appendix_study_courses_description.rar	3_piel_studiju_kursu_apraksti.rar
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	Doktora_diploms_Ainavu_arhitektūrā_EN.pdf	Doktora_diploms_Ainavu_arhitektūra_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	agreement_RTU_LLU.rar	vienosanas_RTU_LLU.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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.	dokt_stud_progr_Ainavu_arhitektūra_AIP_atzinums_EN.docx	dokt_stud_progr_Ainavu_arhitektūra_AIP_atzinums.docx

Civil Engineering (51582)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Civil Engineering</i>
Education classification code	<i>51582</i>
Type of the study programme	<i>Doctoral study programme</i>
Name of the study programme director	<i>Lilita</i>
Surname of the study programme director	<i>Ozola</i>
E-mail of the study programme director	<i>lilita.ozola@llu.lv</i>
Title of the study programme director	<i>Dr.sc.ing.</i>
Phone of the study programme director	
Goal of the study programme	<i>To promote appropriate preconditions and, as a result of the implementation of the program, to develop an internationally competitive generation of scientists for excellent research and academic work in the field of civil engineering, as well as work in public and private institutions at a high professional level with a clear, purposeful development perspective.</i>
Tasks of the study programme	<p><i>To provide an informative and material-technical base for the improvement of scientific work skills, so that as a result of the studies the doctoral student would be able to:</i></p> <ul style="list-style-type: none"> <i>• formulate, research and solve problems in accordance with the principles of scientific research work;</i> <i>• acquire scientific research methods and their application;</i> <i>• acquire in-depth theoretical knowledge in the chosen sub-disciplines and to contribute to its development;</i> <i>• gain some experience of pedagogical work and to be able to present the results of their scientific work to the audience of national and international researchers;</i> <i>• pass promotion examinations;</i> <i>• present research results in national and international conferences and seminars;</i> <i>• publish research results in internationally recognized scientific journals;</i> <i>• develop, submit and defend a doctoral thesis that contains the results of an original scientific research and provides new findings in the field of Civil and Transport Engineering in general or in a specific sub-discipline.</i>

Results of the study programme	<p>An applicant for a doctoral degree in his / her intellectual development must achieve results that correspond to a high level of qualification and ensure:</p> <p>knowledge of the regularities of scientific theories and research methods in the chosen sub-discipline of civil engineering, as well as knowledge of special terms in English and / or German.</p> <p>skills to apply knowledge: to assess the topicality of the problem in the field, to see and evaluate its scientific significance, to choose appropriate research methods; to plan and perform both experimental and analytical research, to summarize the results, to critically evaluate them and to systematize the obtained information using data processing methods. Skills to communicate about one's field of scientific activity and issues in the field of civil engineering both in the scientific community and with professionals in the field. By implementing original research in the chosen direction, they are able to contribute to the expansion of knowledge and / or new understanding of existing concepts and their application in practice, reflecting their performance in internationally cited publications.</p> <p>competence to formulate and analyze in detail problems related to research and professional activities in the relevant sub-discipline of civil engineering, by performing critical analysis and evaluation of results. Integrate knowledge from other disciplines that contributes to the creation of new knowledge and technologies, as well as to the development of research and / or professional methods.</p>
Final examination upon the completion of the study programme	Developed 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 or equivalent higher education in the field of Civil Engineering. If the Master's degree has been obtained in another area of engineering sciences, an entrance examination in the selected sub-area of Civil and Transport Engineering Sciences may be required.
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 Civil and Transport Engineering Sciences
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	<i>Full time studies</i>
Duration in full years	<i>3</i>
Duration in month	<i>0</i>
Language	<i>english</i>
Amount (CP)	<i>120</i>
Admission requirements (in English)	<i>Master's degree or equivalent higher education in the field of Civil Engineering. If the Master's degree has been obtained in another area of engineering sciences, an entrance examination in the selected sub-area of Civil and Transport Engineering Sciences may be required. At least B2 level of English language skills for foreign applicants.</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Doctoral degree Doctor of Science (Ph.D.) in Civil and Transport Engineering Sciences</i>
Qualification to be obtained (in english)	<i>-</i>

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 **degree to be awarded** has changed during the reporting period. After the successful defense of the doctoral thesis in the period until 2019 the applicant was awarded the degree of Doctor of Engineering (Dr.sc.ing.). Starting from January 1, 2020 the degree awarded is a Doctor of Science (Ph. D.) in the sub-discipline, which is determined by the Cabinet Regulation No. 49 of January 23, 2018, "Regulations on Latvian Science Disciplines and Sub-Disciplines". The changes are determined by the amendments of Cabinet Regulation No. 522 of January 23, 2018 and Cabinet Regulation No. 241 of April 28, 2020 to the Cabinet Regulation No. 101 "Procedures and Criteria for Awarding a Doctoral Degree (Promotion)", which provides for the changes in the title of the scientific degree to be awarded also in the already existing doctoral study programs. They are also determined by the classification of Latvian science disciplines and sub-disciplines approved in 2018 (Cabinet Regulation No. 49), which differs from the classification applicable in the previous period.

Further, in accordance with the decision of March 13, 2020 of the Study Quality Commission of the Academic Information Center, applicants will be awarded a Doctor of Science (Ph.D.) degree in Civil and Transport Engineering.

During the reporting period, **the admission rules of the programme were specified**, which was changed from the Master's Degree of Engineering in Civil Engineering to *Master's degree or equivalent higher education in the field of Civil Engineering. If the Master's degree has been obtained in another area of engineering sciences, an entrance examination in the selected sub-area of Civil and Transport Engineering Sciences may be required.* The new admission requirements provide additional opportunities to study in the PhD program "Civil Engineering" also for students of other related engineering areas, which correspond to the new initiatives aimed at interdisciplinary cooperation and research. Applicants for doctoral studies holding previous degree documents awarded by foreign universities are required for recognition of foreign qualification by Academic Information Centre (AIC) of Latvia.

Also, taking into account the interest of foreign students in doctoral studies in the doctoral study program in Civil Engineering at LLU, the programme further **will be implemented also in English**. Thus, the admission rules of the programme include at least B2 level of English language skills for foreign applicants.

Tasks of the study programme

To provide an informative and material-technical base for the improvement of scientific work skills, so that as a result of the studies the doctoral student would be able to:

- formulate, research and solve problems in accordance with the principles of scientific research work;
- acquire scientific research methods and their application;
- acquire in-depth theoretical knowledge in the chosen sub-disciplines and to contribute to its

development;

- gain some experience of pedagogical work and to be able to present the results of their scientific work to the audience of national and international researchers;
- pass promotion examinations;
- present research results in national and international conferences and seminars;
- publish research results in internationally recognized scientific journals;
- develop, submit and defend a doctoral thesis that contains the results of an original scientific research and provides new findings in the field of Civil and Transport Engineering in general or in a specific sub-discipline.

Learning outcomes

An applicant for a doctoral degree in his / her intellectual development must achieve results that correspond to a high level of qualification and ensure:

- **knowledge** of the regularities of scientific theories and research methods in the chosen sub-discipline of civil engineering, as well as knowledge of special terms in English and / or German.
- **skills** to apply knowledge: to assess the topicality of the problem in the field, to see and evaluate its scientific significance, to choose appropriate research methods; to plan and perform both experimental and analytical research, to summarize the results, to critically evaluate them and to systematize the obtained information using data processing methods. Skills to communicate about one's field of scientific activity and issues in the field of civil engineering both in the scientific community and with professionals in the field. By implementing original research in the chosen direction, they are able to contribute to the expansion of knowledge and / or new understanding of existing concepts and their application in practice, reflecting their performance in internationally cited publications.
- **competence** to formulate and analyze in detail problems related to research and professional activities in the relevant sub-discipline of civil engineering, by performing critical analysis and evaluation of results. Integrate knowledge from other disciplines that contributes to the creation of new knowledge and technologies, as well as to the development of research and / or professional methods.

Final examination at the end of the study programme: doctoral thesis

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.

Students in the programme study only in state-funded study places, except for foreign students. Therefore, according to the study places allocated to the programme, the **total number of students** in the doctoral program in civil engineering in each study year varies from 5 to 11 (*Fig. 1*).

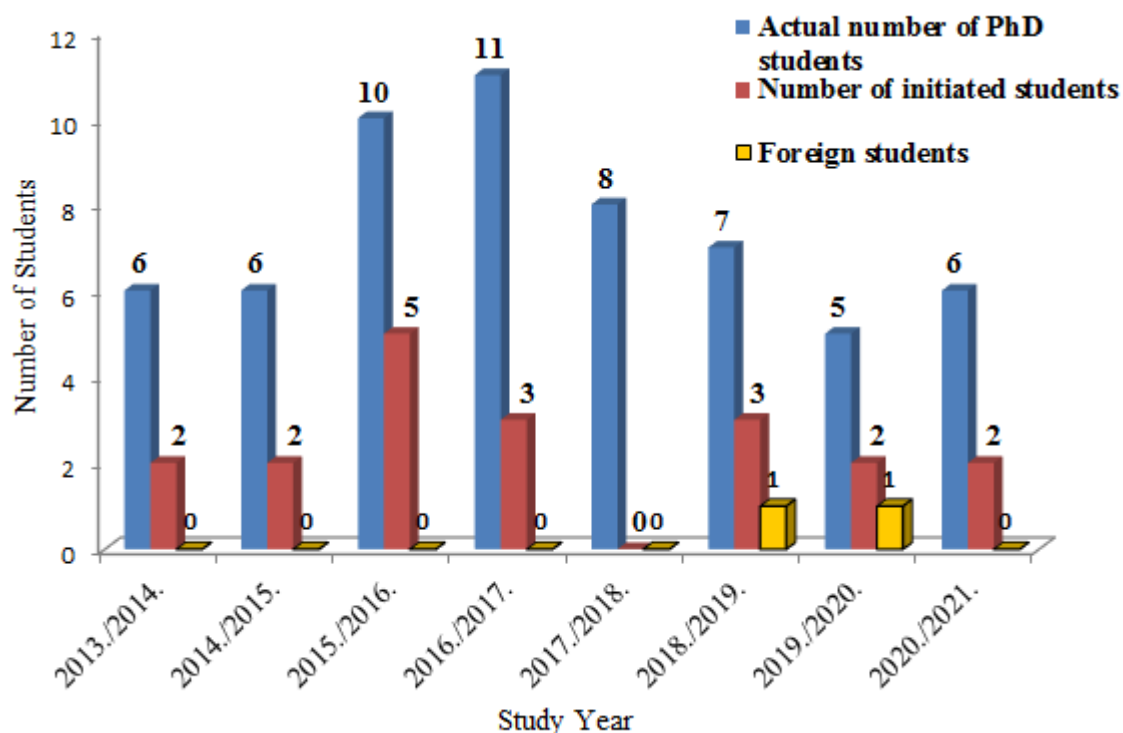


Fig.1. Dynamics of the number of students in the doctoral programme in Civil Engineering in 2013-2020

Changes in the number of students are influenced by various factors. Until now, the **main reason for dropping out of studies** has been insufficient or only fragmentary funding available for research in various projects and contracts. Along with their studies, doctoral students work elsewhere to provide a means of subsistence. This situation creates a lack of time and funding for quality research. This has also been the reason why most doctoral students complete their studies without submitting a doctoral thesis, because the three-year study period was not sufficient to complete it, mainly due to the above-mentioned circumstances. Detailed statistics on the dynamic of number of students in the Doctoral study programme "Civil Engineering" are available in *Appendix No.1*

In order to motivate doctoral students to continue their studies and defend their doctoral theses, LLU has been working on **support programmes for doctoral students** for the last two years. They give the opportunity to devote more time to their research and development of the doctoral thesis. For example, LLU programmes "Strengthening Scientific Capacity of LLU" and "Implementation of fundamental research at Latvia University of Life Sciences and Technologies" provide the opportunity to apply for funding for research, as well as to ensure publicity in international conferences. These support tools have also been used by five students in the doctoral program "Civil Engineering".

Also, in order **to promote further involvement of doctoral students and scientific degree applicants in research and academic work at LLU**, and at the same time increase the number of LLU academic staff with doctoral degrees and form succession in the scientific directions implemented at the university, in the framework of the project "Development of LLU Academic Staff" (No. 8.2.2.0/18/A/014), in the academic year of 2021, one doctoral student of the Civil Engineering doctoral programme was involved in the academic work. After the implementation of the project activity, the doctoral student will continue to work at LLU as a lecturer and researcher at the Department of Land Management and Geodesy.

Also, by 2020 **to 2026, the university aims to create a new model for the development of**

doctoral study programmes in the fields of strategic specialization of the LLU, therefore in 2020 the **LLU Doctoral School was established**. The new approach will offer a different funding model for doctoral students and more close connection with the already strongly developed research directions at LLU, where active work is also taking place within the framework of various research projects. Thus, these directions will be strengthened by reducing the fragmentation of research, creating succession and visibility. The new model will also focus on the involvement of doctoral students and doctoral degree holders in the academic and research work of the LLU, promoting the development and succession of academic staff.

Already starting **from 2021, a new support program has been launched, which allows doctoral students to apply for a grant for research** within the project "LLU transition to the new doctoral funding model" (No. 8.2.2.0/20/I/001).

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 doctoral study programme "Civil Engineering" is designed as the final stage of the second cycle of education envisaged in the Bologna Declaration. The study programme has been developed on the basis of the Constitution of the Republic of Latvia, in accordance with the Law on Higher Education Institutions and the Law on Scientific Activity. The research directions defined in the study programme comply with the "Regulations on Latvian Science Disciplines and Sub-Disciplines" (Cabinet Regulation No. 49 of January, 2018), which also coincides with the **degree of Doctor of Science (Ph.D.) in civil and transport engineering**. Also, the preconditions, content, aim and tasks of the admission to the programme "Civil Engineering" are closely connected with the sub-disciplines of the field of science "Civil and Transport Engineering Sciences": Construction materials and technology, Structural analysis, Structural Engineering, Geodesy and geoinformatics, as well as Heat, gas and water engineering systems. According to the sub-disciplines, the topics of doctoral theses have been selected and scientific projects have been developed with the aim to solve the current problems in the mentioned sub-disciplines. As the admission requirements of the program allow masters of other engineering areas to be enrolled in the PhD program of Civil Engineering at LLU, for example, graduates of the LLU master's program "Environmental, Water and Earth Engineering"; it is possible to develop research in geodesy and geoinformatics using modern laboratories in line with the research program of the LLU Development Strategy 2015-2022, where one of the goals indicated is to develop research in the field of remote sensing, geodesy and spatial planning, using modern and innovation-based technologies.

The strategic goal of the study programme is to dynamically develop the field of engineering at LLU within the framework of the Latvian higher education system, so that the obtained scientific degree and diploma would be recognized both in Latvia and in other European countries.

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 doctoral study programme “Civil Engineering” courses and the topics of doctoral theses are closely connected with the goals and action programs of **the Development Strategy of Construction Industry in Latvia 2017-2024** and **the Development Strategy of Latvia University of Life Sciences and Technologies 2015-2022**. One of the goals of the development of the construction industry in Latvia is to engage intelligent and qualified specialists and the development of efficient construction processes. This is best described by a quote from the Development Strategy of Construction Industry in Latvia 2017-2024:

"In order to meet the needs of the industry regarding the number of specialists and the increase in the quality of professional qualifications, it is necessary to improve all levels of civil engineering education and professional qualification system. A system should be set up in which every worker in the construction sector is required to prove their level of professional qualification. In the next ten years, the engineering knowledge of the construction industry will have to integrate with new competencies: information and communication technologies, intelligent manufacturing, energy efficiency, construction of passive buildings. Civil engineering education institutions need to improve structural analysis and new construction technology programs and at the same time introduce new social and digital competencies. The emphasis should not be on the number of specialists, but on the quality of specialists' knowledge and skills, especially in the fields of engineering. Substantial investment is needed in future teachers and internship placements."

Priority research fields defined by Development Strategy (2015-2022) of Latvia University of Life Sciences and Technologies in engineering Sciences, such as *“Sustainable civil engineering, development of new, innovative building materials, research of their properties”*, *“Safety and performance of building structures under long-term load”* and *“Remote sensing, geodesy and geospatial research”*, directly correspond with the aims and tasks of the Latvian strategy for the construction industry.

The above-mentioned priority research directions are also in line with current international strategies, such as **the European Green Deal**, which, in turn, is linked to **Latvia's Sustainable Development Strategy** and several initiatives based on the introduction of **the circular economy in Latvia**. These include research into the use of wood, as well as various native biomaterials in construction, the development of new innovative building materials, such as new composite on foam gypsum basis with hemp fibre reinforcement. Also of constant relevance are the safety of buildings, energy efficiency of buildings, sound transmission through and absorption by enclosure structures and other aspects ensuring the quality of the living environment in building, aimed at prevention of danger to health and life of every person. In its turn, the Development Strategy of Construction Industry in Latvia 2017-2024 pays special attention to **the digital competence of specialists**. In accordance with the current actualities in the field, doctoral degrees have been awarded, defending doctoral theses on the following topics: Investigation and Prognosis of Steel Fibre Concrete Deformation Properties; Foam Gypsum Technology Development for Sound Absorption Material Production, The Evaluation and Improvement of the First-Order

The teaching staff of the programme regularly gets acquainted with current issues in the industry, as they **participate in various commissions and working groups established by the industry institutions** (Latvia Society of Civil Engineers, Latvian Acoustics Association), as well as regularly discuss current issues within scientific and practical conferences and seminars. Also, several lecturers of the programme are **experts of the Latvian Council of Science** in the field of Civil and Transport Engineering, full members of the Department of Engineering of **the Latvian Academy of Agricultural and Forest Sciences**, thus they are closely familiar with the scientific issues in the field. The content of the special study courses of the sub-disciplines is regularly reviewed and adjusted in accordance with the development tendencies in civil engineering and the strategic goals of the development stated for the construction sector. The special study courses of the research direction are closely related to the topic of the dissertation and accordingly reflect the current problems in the construction sector, such as increasing energy efficiency, modelling the behaviour of structures, creation of innovative ecological materials, research and development of new technologies, etc. Compulsory study courses provide the necessary theoretical knowledge base and skills to use modern information technology in research planning and data analysis, as well as academic English and/or German language to successfully write reports on research results, prepare articles for publication in proceedings and/or scientific periodic issues, and also deliver presentations in international scientific forums.

The awarding of Doctor of Science (Ph. D.) in Civil and Transport Engineering Sciences is based on the achievements and findings in the field of civil engineering, as the research topics developed in the doctoral theses directly correspond to the goals and objectives of the Strategy of Construction Industry in Latvia 2017–2024, for example, the doctoral thesis on heat energy consumption problems in public buildings, or the parameters characterizing the fire resistance of structures and their specification, topic devoted to the development of deformations in short-fiber concrete under static loading and durability, and others.

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 courses to be acquired in the doctoral study programme “Civil Engineering” is directly related and purposefully planned in order to prepare and guide doctoral students in successful, knowledge-based research work, the results of which gradually turn into their doctoral thesis.

Tasks of the study programme are to provide an informative and material-technical base for the improvement of scientific work skills, so that as a result of the studies the doctoral student would be able to:

- formulate, research and solve problems in accordance with the principles of scientific research work;
- acquire scientific research methods and their application;
- acquire in-depth theoretical knowledge in the chosen sub-disciplines and to contribute to its

development;

- gain some experience of pedagogical work and to be able to present the results of their scientific work to the audience of national and international researchers;
- pass promotion examinations;
- present research results in national and international conferences and seminars;
- publish research results in internationally recognized scientific journals;
- develop, submit and defend a doctoral thesis that contains the results of an original scientific research and provides new findings in the field of Civil and Transport Engineering in general or in a specific sub-discipline.

An applicant for a doctoral degree in his / her intellectual development must achieve results (**learning outcomes**) that correspond to a high level of qualification and ensure:

- **knowledge** of the regularities of scientific theories and research methods in the chosen sub-discipline of civil engineering, as well as knowledge of special terms in English and / or German.
- **skills** to apply knowledge: to assess the topicality of the problem in the field, to see and evaluate its scientific significance, to choose appropriate research methods; to plan and perform both experimental and analytical research, to summarize the results, to critically evaluate them and to systematize the obtained information using data processing methods. Skills to communicate about one's field of scientific activity and issues in the field of civil engineering both in the scientific community and with professionals in the field. By implementing original research in the chosen direction, they are able to contribute to the expansion of knowledge and / or new understanding of existing concepts and their application in practice, reflecting their performance in internationally cited publications.
- **competence** to formulate and analyze in detail problems related to research and professional activities in the relevant sub-discipline of civil engineering, by performing critical analysis and evaluation of results. Integrate knowledge from other disciplines that contributes to the creation of new knowledge and technologies, as well as to the development of research and / or professional methods.

The connection between the study courses to be acquired in the doctoral study programme “Civil Engineering” and the results to be achieved (learning outcomes) is reflected in the **Study Course Mapping** (Appendix No. 2).

During the reporting period, the doctoral study programme “Civil Engineering” has continued and expanded the previously developed research directions, which create an informative base for the critical evaluation and implementation of innovative solutions in construction:

Sustainable civil engineering, development of new, innovative building materials, research of their properties

Related topics of the PhD Theses:

- Foam gypsum technology development for Sound Absorption Material Production;
- Acoustic parameters of sacred buildings and methods of improvement;
- Research on heat and vapour flows within foam gypsum material with plant fiber reinforcement;
- Multilayer structures sound insulation parameter optimization by structural changes;
- Water vapour diffusion into roof structures;
- Wall structures with effective heat and sound insulation;
- Research of Technology and Properties of Composite Spropel-Hemp Shives Material;
- Influence of ash type additives to physical mechanical properties of foam gypsum;

- Improvement of Sustainability of foam gypsum acoustic plate;
- Research on Fire Impact to Structures Made of Foam Gypsum Composite Material;
- Multilayer Enclosure Structures with Foam Gypsum Layer for Sound Insulation;
- Possibilities of use the tree leaves as ecological heat insulation material.

Optimization of building energy resources

Related topics of the PhD Theses:

- Thermal Energy Consumption in Public Buildings
- Climate Data Model of Building Sustainability Forecast

Safety and performance of building structures under long-term load

Related topics of the PhD Theses:

- Analysis of load bearing capacity of shear connections of precast reinforced concrete structures
- Analysis of Influence of Graphene and Steel Fibers on the Stiffness of Reinforced Concrete Structures in Bending
- Investigation and Prognosis of Steel Fibre Concrete Deformation Properties
- Methodology for determination of the rotational stiffness modulus of moment resisting connections between timber elements
- Elasto-Plastic Analysis of Steel Construction Elements
- Factors Affecting the Creep Development in Timber Structures under Longterm Loads and Numerical Estimates for Design
- Research of effectiveness of connectors in timber-concrete composite elements of bridge structures
- Specification of characteristics of fire protection ability of building and recommendations for definition of fire safety level

Remote sensing, geodesy and geospatial research

Related topics of the PhD Theses:

- The Evaluation and Improvement of the First-Order Levelling Network of Latvia
- Application Possibilities of Geographic Information Systems and Remote Sensing Technologies in Spatial Planning in Latvia
- Geodatic and Cartographic Work Technology of State Border Demarcation
- European Vertical Reference System Influence in Latvia
- Improvements of the Real Estate Assessment Methodology Using the Fuzzy Logic Approach

By implementing the doctoral study programme “Civil Engineering”, **the academic capacity of the teaching staff has been strengthened**, and a justification for the purchase and application of **modern equipment in the scientific laboratories of Structural engineering, Building Materials and Acoustics has been created**. The research results have been published and indexed in the SCOPUS and WoS scientific article databases. Several patents have been submitted and approved.

Most doctoral students who are graduates of LLU continue their research started during their Master’s studies. We engage Masters of engineering sciences for doctoral studies, whose intellectual potential is sufficient for mastering the doctoral study programme. Some doctoral students supplement the teaching staff in related departments and acquire pedagogical experience (Fig.2).

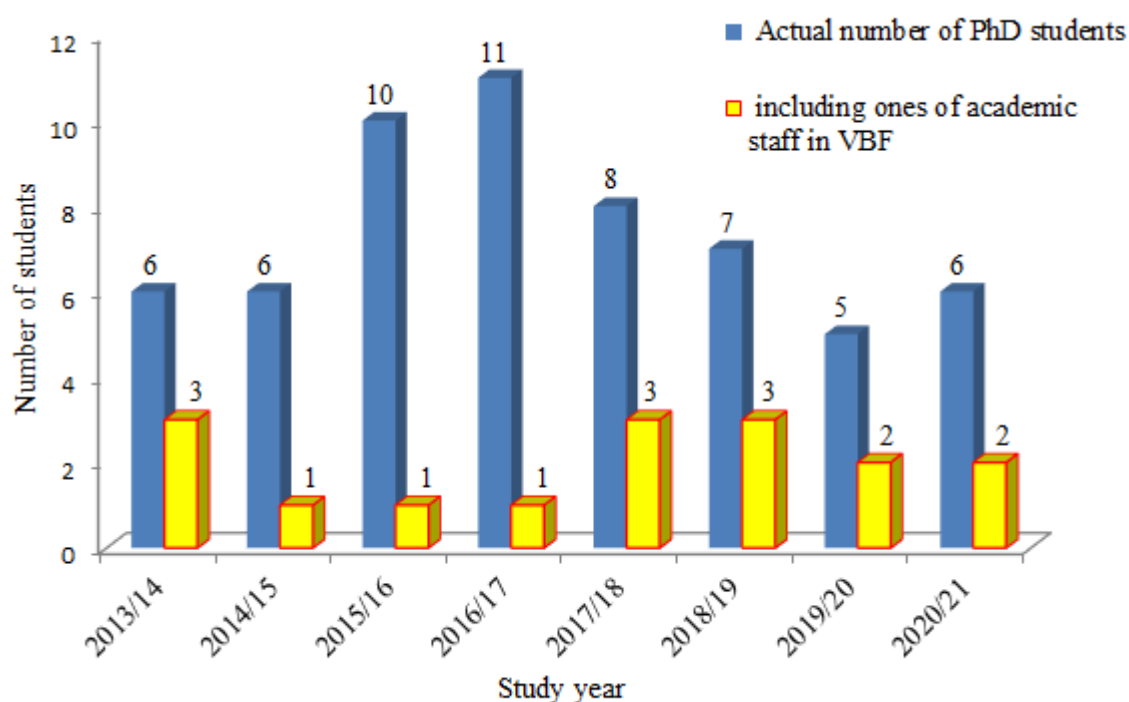


Fig.2 Involvement of doctoral students of the PhD programme Civil Engineering into academic work (2013.-2020.)

During the reporting period, three doctoral graduates of programme continue to work at LLU and are currently elected to academic positions as professors and leading researchers, they work with students of all levels and continue to work on research projects and contracts with industry companies. Either in the framework of the project “Development of the LLU Academic Staff” (No. 8.2.2.0/18/A/014), in the academic year of 2020/2021, one doctoral student of the Civil Engineering doctoral programme was involved in the academic work. After the implementation of the project activity, the doctoral student will continue to work at LLU as a lecturer and researcher at the Department of Land Management and Geodesy.

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.

Doctoral studies are organized in accordance with the Regulations of Doctoral Studies of the LLU (<https://www.llu.lv/index.php/en/study-guide-documents>). The programme is implemented in accordance with the LLU doctoral study programme implementation guidelines, approved on November, 2017. The doctoral thesis is supervised and managed by the Vice-Rector for Science of the LLU, the study process is organized by the University Study Center and the programme director in cooperation with the faculty management.

The duration of full-time studies in the doctoral study programme “Civil Engineering” is 3 years. The total amount of credit points is 120 CP (180 ECTS). **Theoretical studies envisaged in the study**

programme take 25% of the total CP, the remaining 75% are intended for **theoretical and experimental research in the chosen thematic direction of the sub-discipline** (Fig. 3), as a result of which publications are created and the content of **the thesis is formed**. Study plans to be implemented in Latvian and English are provided in the *Appendix No.3.1* and *Appendix No. 3.2*. The direction of the research and the appropriate perspective supervisor of the thesis is selected and agreed with the doctoral student before the official admission. The doctoral student's interests are always paramount.

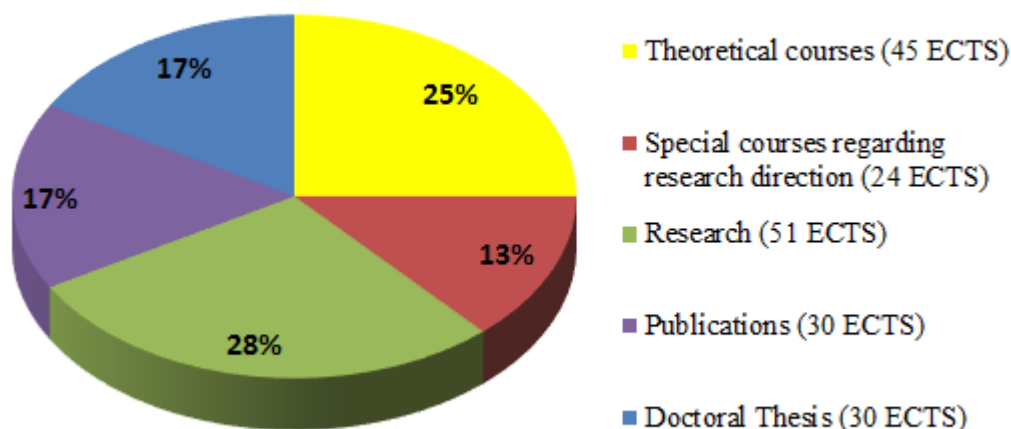


Fig. 3 Distribution of credit points in the Doctoral study programme "Civil Engineering"

Each doctoral student of the programme acquires the respective study courses and passes three promotion examinations: 1) special course of a foreign language, 2) special course of a science sub-discipline, 3) special course of the research direction. The doctoral examination is open, it is accepted by the examination commission approved by the Rector of the LLU and consisting of three doctors of sciences. The evaluation is given in a 10-point system in accordance with the LLU Study Regulations. Descriptions of study courses are available in the *Appendix No. 4*.

The most important part of the work aimed at results (doctoral thesis) of the doctoral studies is **scientific research**. LLU scientific laboratories, computer software, sources of scientific information of the Fundamental Library, as well as research resources of other Latvian scientific institutions are used for this purpose, if necessary. In the implementation of the projects the funds are attracted from the companies interested in the research results.

Every year, **the doctoral student speaks at seminars and conferences**, presenting the obtained research results, followed by **scientific publications**, the content of which gradually turns into a **doctoral thesis**.

The applicant for the scientific degree submits the completed doctoral thesis to the LLU Administrative Center for registration. After registration, the Administrative Center sends the doctoral thesis to the Promotion Council of the LLU in the discipline of "Civil and Transport Engineering". The Promotion Council under the leadership of the Chairman carries out the promotion procedure in accordance with the Cabinet Regulations of the Republic of Latvia No. 1001 "Procedures and Criteria for Awarding a Doctoral Degree (Promotion)", specified in the Regulations of LLU on Promotion and Promotion Councils (last amended on May, 2020). After the successful defense of the doctoral thesis in the period until 2019 the applicant was awarded the degree of Doctor of Engineering (Dr.sc.ing.). Further, in accordance with the decision of March, 2020 of the Study Quality Commission of the Academic Information Center applicants will be awarded a Doctor

of Science (Ph.D.) degree in Civil and Transport Engineering.

The implementation of the doctoral study programme in civil engineering takes place **using the existing experience**, as well as the doctoral study experience of related foreign universities. In the practical implementation of the programme, the main attention is paid to the selection of **topical topics that would facilitate the fulfillment of strategically important tasks in the construction industry**.

Comparing the doctoral program in Civil Engineering at the LLU and the doctoral programs at the universities of the Nordic countries (Denmark, Norway, Finland, Sweden), one of the differences is that the duration of doctoral studies at those universities is four years. This allows for a three-year research programme and the compilation of results and the presentation of the doctoral thesis - in the fourth year. The implementation of doctoral programmes at Latvian universities, LU and RTU, as well as at Vilnius Technical University in Lithuania takes place similarly to LLU.

Study implementation methods used in the study courses

Up-to-date information for doctoral students and guidelines for the implementation of the program are available in the section Studies - Doctoral studies on the LLU website (<https://www.llu.lv/en/study-guide-documents>). Each individual study course program is available in the section "Course Catalogue" of the LLU portal using link https://lais.llu.lv/pls/pub/pub_nod.main?l=2&p_au=G&p_mg=FO0054&p_atrk=visi_sem&p_sem=C50034&p_prog=G0321&p_nod=B40101&p_var=dien&p_semi=C50034, as well as instructions (list of recommended literature, links to information sources, seminar plan, etc.) are placed in the e-learning system of the LLU website based on Moodle software. The acquisition of the study program is implemented in lectures and seminars, including those delivered by visiting professors. A doctoral student's independent research work plays an important role in doctoral studies through consultations with a supervisor of the dissertation and other researchers of the faculty, as well as by gaining research experience in other countries through participation in international forums, researching global web resources or participation in various discussion platforms. The study program envisages individual studies in the chosen sub-discipline of civil engineering, as a result of which doctoral students prepare reports, participate in scientific conferences and prepare articles, including those indexed by SCOPUS.

In the implementation of the study process, the principles of student-centered education are taken into account: doctoral students' interests are respected both in the choice of the topic of the dissertation and in trying to adjust the schedule of contact hours in the days off. The students' willingness to be independent is greatly promoted, at the same time providing guidance and support by supervisors.

The evaluation system of doctoral study courses and research work results is based on the following principles:

- mandatory assessment - the need to obtain a positive assessment for each study course and research stage;
- accumulation - the knowledge acquired by the student is evaluated by summing up all the positive evaluations obtained during the studies;
- openness and clarity of requirements - when starting studies, students are informed about the content, requirements and evaluation of the study course and the respective scope of their research work.

Study results in the program are evaluated according to two indicators:

- qualitative assessment - a mark in a 10-point system or a test (passed, failed);
- quantitative assessment - the number of credit points according to the scope and significance of the study course or research work.

Doctoral students' competence is assessed on the basis of the order of the Ministry of Education and Science of the Republic of Latvia, in accordance with the ECTS (European Credit Transfer System) standard adopted by the Republic of Latvia and in accordance with the LLU Study Regulations.

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 PhD programme Civil Engineering does not include practice. But it should be noted that all doctoral students work at the University, private or state companies. Often the chosen topic of the doctoral thesis is related to current problems that highlights during the work.

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 topic of the doctoral thesis is defined by entering doctoral studies, assessing in each individual case its **topicality in the field**, as well as **compliance with the research directions in the field of civil engineering marked in the LLU development strategy**. An overview of the topics developed in doctoral studies in civil engineering is given in *Section 2.2*. The topics of the four doctoral theses defended in the reporting period have contributed to the construction industry and the development of the scientific base of the Faculty of Environment and Civil Engineering.

On June, 2013, the doctoral thesis on the topic ***“Investigation and Prognosis of Steel Fiber Concrete Deformation Properties”*** was defended before the Promotion Council of Civil Engineering of the LLU. The Doctoral Thesis provides models, which are applicable for evaluating various factors determining the deformation and strength properties, mechanical behaviour, and durability of steel fibre reinforced concrete. To promote use of SFRC in structural application, comprehensive design rules are needed. As part of this promotion work, on the basis of fib Model Code 2010 appendix to Latvian Standard LVS EN 1992-1-1 is prepared and submitted to the Latvian National Standardization body Latvian Standard LVS / STK 30 Construction. The knowledge and experience acquired during the development of the doctoral thesis serve as a basis for the successful further development of the Scientific Laboratory of Building Structures and cooperation with entrepreneurs in various researches. Since 2019, the laboratory has been regularly researching new, steel fibre reinforced concrete composites, which are ordered by such companies as SIA “Dzelzsbetons MB” and SIA “Piche”. The topicality of the research is also confirmed by the obtained funding in the implementation of the ERDF program “Growth and Employment” Activity

1.1.1.2. "Post-doctoral research support" project "Efficiency of fibre reinforced cement composites in structural walls" (1.1.1.2/VIAA/3/19/487).

The second doctoral thesis defended at the Promotion Council hearing was on the topic "**Foam Gypsum Technology Development for Sound Absorption Material Production**", which gave a significant contribution for improvement of the manufacturing technology of foam gypsum sound absorption material including original research on effect of disperse hemp shives reinforcement to pore structure of foam gypsum and its physical mechanical properties. As a result of the research, a new mathematical model of foam gypsum moisture return was defined. The results of the research are also included and confirmed in patents no. 15085A and 15085B "Finishing acoustic board and its manufacturing method", which was developed by an interdisciplinary group of researchers. The information base of the doctoral thesis served as a basis for the further development of the Building Materials Scientific Laboratory in the field of research of sound transmission and absorption properties of building materials.

On September, 2014, the doctoral thesis "**The Evaluation and Improvement of the First-Order Levelling Network of Latvia**", the theoretical importance and novelty of the research work is proved by accurate evaluation of the latest precise levelling results in Latvia, by the model created for the vertical movement dynamics of Earth crust, and the model constituted for the development of the state height system, as well as exciting study of the precise levelling history in Latvia. Practical significance of the study is proved by 1) patent Nr.14529 "Device and a Method for Precise Levelling Rod Reading in Long Distances"; 2) improvements implemented regarding the design of geodatic ground signs; 3) Priekule fundamental (secret) benchmark group location works realised; 4) method approbated for connection of the LatPos base antennae to the precise levelling network by using geometric levelling; 5) GNSS levelling works executed in the points of Latvian levelling network.

Taking into account that the three young scientists mentioned above continue to work at LLU as elected academic staff, under **their leadership research activities in the above-mentioned fields are continued, involving also Master's and doctoral students in the research process.**

On February, 2015, the doctoral thesis "**Thermal Energy Consumption in Public Buildings**" before the Promotion Council of Civil Engineering of the LLU . The scientific significance of this research work is demonstrated by the algorithm developed for optimising thermal energy consumption (GOSPIL) in public buildings with purpose to improve their energy efficiency. The thesis also develops a methodology for capital investment evaluation. The author's heat energy optimization algorithm and economic evaluation methodology are applied in construction. The study is important because it provides new information on the use of thermal energy resources in local public buildings, based on heat consumption data comparative analysis of newly constructed, renovated and of non-renovated buildings, thus revealing a number of important factors that reduces thermal effectiveness of newly constructed and renovated buildings, and which must be taken into account by both the builders and building service managers and need to be addressed in order to achieve the planned energy efficiency.

The evaluation of doctoral theses takes place in accordance with the *regulation of the Cabinet of Ministers No. 1001 "Procedure of and Criteria for Awarding Doctoral Scientific Degree"* and *LLU Regulations "On promotion boards and promotion"* (https://www.llu.lv/sites/default/files/2020-05/LLU_promocijas_nolikuma_grozijumi.pdf (in Latvian)) at the open meeting of the LLU Promotion Board in Civil and Transport Engineering Sciences after defending the doctoral thesis. The decision to award or refuse the degree - Doctor of Science (Ph. D.) - is made by the board by a majority vote, open voting. If the votes are equally divided, the

board shall hold a discussion and vote again. If, after re-voting, the votes are equally divided, the board shall re-examine the work, but not earlier than one month and not later than six months after the meeting of the promotion board at which no decision was made. Until the next meeting of the board, an applicant has the right to make corrections in the dissertation after coordination with the chairperson of the board.

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.

During **the survey of doctoral students**, their evaluation was obtained (good / satisfactory / poor):

- on the compliance of the content of the courses of the doctoral study programme in Civil Engineering with the objectives of the programme
- on the doctoral student's own assessment regarding his/ her basic theoretical knowledge for doctoral studies
- on provision of information sources at LLU (library, available databases, etc.)
- on the material and technical base that was / is available during the doctoral studies
- on the material support for the activities of the doctoral student (participation in conferences, purchase of research materials, etc.)
- on the format of academic supervision / consultations during the doctoral studies at the LLU

The results of the student survey show that 63.6% of the respondents generally evaluate the implementation of the programme as “good”, 27.3% of the respondents - as “satisfactory”, but 9.1% of former doctoral students are dissatisfied. Dissatisfaction of some doctoral students with their studies is mainly caused by such factors as insufficient material provision, insufficient informative and stimulating support.

As far as possible, the results of surveys are evaluated by the director of the program by analyzing the indicated drawbacks and later improving the content and quality of studies, but, due to the small number of students and very different interests, views, intelligence and experience of young researchers, it is not always possible to help and promote effective research work, as well as development and defense of doctoral thesis.

Taking into account also the common need for the introduction of a new model doctoral studies, which would be oriented towards more financial support for doctoral studies and research, publication of results, as well as doctoral students' involvement in LLU academic and research work, the University aims to create a new model of doctoral study programme by 2020-2026 in the fields of strategic specialization of the LLU. To implement this goal, a doctoral school of the LLU has already been established. There are also several LLU support grants available for research implementation.

During the studies, the supervisor of the doctoral thesis constantly communicates with the doctoral student, the supervisor is selected during the admission in accordance with the research topic and opportunities of productive further collaboration. As the majority of doctoral students are graduates of the LLU, usually the incorporation of research topics and mutual cooperation is formed already during the undergraduate and Master's studies. During the doctoral studies, it is also possible to

change the scientific supervisor, or to engage another supervisor, consultants with the appropriate competence in the topic, if it is necessary for the quality development of the doctoral thesis.

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.

Long-term mobility, for example within the ERASMUS+ program, has not taken place at the doctoral level, as all doctoral students are in full-time employment relationships with companies. At the same time, **international communication and information exchange takes place**, because doctoral students participate in international conferences, where they present their research results, participate in the work of conference sections and in the meantime communicate with foreign colleagues and doctoral students, see *Appendix No.5*.

Doctoral students have the opportunity to communicate with visiting professors from the University of Maribor, the Estonian University of Life Sciences, Riga Technical University, as well as in business discussions with professors from Vilnius Gediminas Technical University, University of Trás-os-Montes e Alto Douro UTAD, Wrocław University of Life Sciences, and Aleksandras Stulginskis University in Kaunas.

Incoming mobility of doctoral students was not implemented during the reference period.

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 following study, research, informative and material resources are available in the implementation of the doctoral study programme "Civil Engineering":

- **Study and science base (including informative resources)**

The LLU website contains information on doctoral study programmes, detailed information on admission rules, admission procedure and forms of admission documents to be prepared <https://www.llu.lv/en/doctoral-study-programme-civil-engineering> The potential doctoral students can get acquainted with the admission criteria for state-funded doctoral study places: <https://www.llu.lv/lv/doktora-studiju-iespejas> (in Latvian). Information is also available to potential applicants for doctoral studies from abroad: <https://www.llu.lv/en/degree-programmes> .

All LLU regulatory documents related to doctoral studies are easy to find and access on the LLU website: Competition procedure for state-financed study place, Tuition fees in study programmes etc.. Also, all the necessary application forms, study year plan and report forms are available, as well as information on the study procedure, theoretical study courses and other current information is provided at <https://www.llu.lv/lv/aktuala-informacija-studejosiem> (in Latvian) and <https://www.llu.lv/en/study-guide-documents> (in English), such as: Regulation of Doctoral Studies, Code of Ethics, On Academic Integrity Violations in Students' Theses/ Doctoral Theses etc.

In order to facilitate studies, a register of study courses has been created, where students can get acquainted with the descriptions of study courses, obtain information about the acquisition of courses, assessment requirements <https://lais.llu.lv/pls/pub/kursi.startup?l=2> . In the study process, the teaching staff makes extensive use of the LLU e-learning system (program MOODLE), where study materials are published, lectures are organized online, etc. In the LLU information system (LLU IS), each student / doctoral student can use his / her user account to follow his / her study progress.

A special section of the website contains information and documents on the promotion procedure: Cabinet Regulations No.1001 and No.1000; Regulations for the technical design of the scientific work to be submitted to the Promotion Council, as well as the LLU promotion documentation <https://www.llu.lv/lv/promocijas-kartiba> (in Latvian).

The doctoral study programme "Civil Engineering" is implemented by the Faculty of Environment and Civil Engineering (Department of Structural Engineering, Department of Architecture and Building and Department of Land Management and Geodesy) and the Faculty of Information Technology (Department of Control Systems), as well as the Language Center of the LLU and, to a lesser extent, the teaching staff of the Institute of Soil and Plant Sciences of the Faculty of Agriculture are involved. The main tasks of these departments are listed in the tables below. However, in general, the number of structural units involved in research in certain periods (according to the research direction to be implemented) may also be higher, as there is also cooperation with the Department of Wood Processing of the Forest Faculty and the Institute of Forest and Wood Products Research and Development, the laboratories and equipment of which is used also in the research work of doctoral students in Civil Engineering.

In general, the doctoral study programme "Civil Engineering" involves structural units (*Table 1*), which have the appropriate informative and scientific research base for the studies, which ensures the implementation of a high-quality study process.

Table 1

Structural units involved in the implementation of the doctoral study program *Civil Engineering* and their tasks

No.	Department	Faculty	Tasks in implementation of the Programme
1	Department of Structural Engineering	Faculty of Environment and Civil Engineering	Management of the doctoral study programme in the field of civil and transport engineering Research, supervision of doctoral thesis, teaching sub-discipline courses "Structural Engineering" and "Structural analysis", special courses of the research direction „Cement composites and composite structures" and "Timber Engineering"

2	Department of Architecture and Building	Faculty of Environment and Civil Engineering	Research, supervision of doctoral thesis, teaching sub-discipline courses "Construction Materials and Technologies" and "Heat, Gas and Water Engineering Systems", special courses of the research direction „ Technology of Heat and Acoustic Materials and Products" and „ Climate control systems and their operation"
3	Department of Land Management and Geodesy	Faculty of Environment and Civil Engineering	Research, supervision of doctoral thesis, teaching sub-discipline courses "Geodesy and Geoinformatics" , special courses of the research direction „ Precise geometrical levelling" un "Real Property Management"
4	Department of Wood Processing	Forest Faculty	Participation in research and supervision of doctoral theses related to wood research.
5	Department of Control Systems	Faculty of Information Technologies	Research, supervision of doctoral thesis, teaching study courses „Scientific research methodology", „Multivariate Data Analysis (I+II)"
6	Department of Physics	Faculty of Information Technologies	Cooperation, support and consulting of doctoral students in the research of physical and mechanical properties of building materials
7	Institute of Soil and Plant Sciences	Faculty of Agriculture	Teaching study courses „Preparation of scientific papers" . Cooperation in research on the use of local biomaterials (hemp) in buildings
8	Institute of Mechanics	Faculty of Engineering	Cooperation in research on machining approaches for local biomaterials (hemp) for use in construction.
9	Language Center		Teaching study courses „ English/German for Research Professionals"and "Latviešu valoda I"

The Fundamental Library of the LLU provides ample opportunities to obtain scientific literature. LLU database subscriptions can be used to search for information sources that are not available in the library collection, as well as interlibrary loan services can be used. The search engine LLU Primo Discovery, online databases BIS Aleph500, online databases created in the Fundamental Library of LLU (8 databases of different levels) are available for searching of scientific literature. Faculty and doctoral students are informed about databases to which access is granted on a temporary basis. Databases of lecturers' publications and doctoral theses have also been created. The staff of the library provides consultations on current events, as well as advises students on searching for scientific information.

A wide collection of scientific literature sources is available to doctoral students in the Fundamental Library of the LLU. During the period 2013-2020, the collection of study and scientific literature sources in the fields of engineering, mathematics, physics, chemistry, construction, architecture

and life sciences has increased by 487 units (Figure 4).

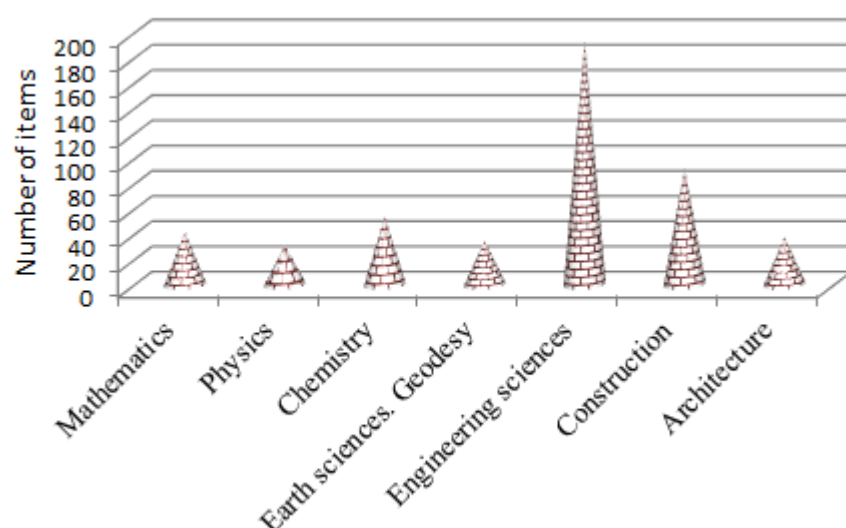


Fig. 4 Supplement to scientific literature sources in the Fundamental Library of the LLU during period 2013-2020

Doctoral students have access to databases subscribed to by the LLU:

- CAB Abstracts;
- Taylor & Francis Group CRC Press e-books;
- ScienceDirect journals;
- Web of Science;
- Scopus.

Materials and technical base According to the research direction, doctoral students use the resources of the faculty's scientific and teaching laboratories.

The main equipment and facilities of **Scientific and training laboratories of Structural Engineering**.

In recent years, compression testing machine Type ALPHA 3-3000 for testing large-scale models and a high-precision fiber-reinforced concrete testing equipment DELTA 5-300 S have been purchased and put into operation. The set includes a hydraulic station PA 19-280bar-WKN, control and test control system RS-C30-N-PC with software package PROTEUS. Researchers have a variety of measuring devices at their disposal to measure and digitally record displacements. With a multi-channel strain gauge set consisting of two Quantum MX 440B and MX 1615 B data receivers, it is possible to simultaneously record data from 16 strain gauges and 4 inductive displacement sensors. The universal test device INSTRON (250 kN) has been used for many years to test various materials and building construction models in compression, bending and tension. For the loading of large, relatively full-scale curved structures, a 6.0 m long floor with two movable frames and synchronizable hydraulic Zwick power cylinders and a pump station with a maximum force of 400 kN is available. All power units are regularly calibrated once a year. The scientific laboratory of Structural Engineering is equipped with a bridge crane (40 kN) and the necessary materials and tools. The researchers can use a bar locator Proceq SA with accessories and an ultrasonic device for testing the strength of materials. For the research topics of the promotion work, testing frames have been installed and are used for tests of structural timber models under long-term loading.

The **Building materials scientific laboratory** is equipped with modern equipment and facilities for research of material production technologies and testing of physical and mechanical properties.

Researchers have at their disposal a DHR-3 rotary-oscillation rheometer, a natural convection drying oven, vapor permeability chambers, thermal chambers, an automated particle size and shape analyzer and a pulverizer (mill) Pulveeisetze 16, Fritsch GmbH, to test and develop a new composite building material manufacturing technologies. The four-channel acoustic measurement analyzer "SOUNDBOOK", sound absorption tube, impact noise generator, ICP microphone set, microphone calibrator NC-74, noise leveler and other devices are used for research of acoustic properties of materials and structures. An acoustic chamber has been developed that allows sound absorption studies to be performed on various models of medium-sized wall and floor materials and structures. Measurement data is processed by Software NWWin.

The GIS Competence Center, the Photogrammetry and Geodetic Instrument Calibration Laboratory are at the disposal of researchers. They are equipped with state-of-the-art equipment for remote sensing and precise geodetic measurements, tools and hardware are available, GNSS instrument kit Stonex S700A, terrestrial 3D laser scanner kit Stonex X300, GNSS receiver Trimble R8 GNSS kit, GP Base Station Kit with software, GP Base Stations receiver geodetic antenna, meteorological station 10-WC-18-A, robot-tachymeter set with equipment, rotary level, level-digital set and other equipment.

Computer classrooms are provided with special structural analysis software *DLUBAL RFEM*, *IDEA Static Steel*, *Tekla Structures*, *Axis VM*, as well as building acoustics noise analysis software (Software BASTIAN), software for environmental noise modeling *SoundPLAN*, computer software *Architektur and Engineering Suite 2011 EDU NLM 10 Pack* and computer software for passive house design *Passive House Planning Package PHPP 7*. In the Department of Management Systems of the Faculty of Information Technology, where doctoral students of Civil Engineering also study, data analysis software with *SPSS Statistics 22* basic version and *RStudio* program are available in the computer classroom.

For specific research, LLU researchers and **doctoral students have access to scientific laboratories and equipment also in other structural units of LLU**, by prior agreement. Information on available scientific equipment at LLU is compiled in a single database and is freely available <https://www.llu.lv/lv/zinatniska-inventara-datubaze> (only in Latvian).

Financial resources

The number of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for 2021 stipulates that **the basic cost of one study place is 1630.11 EUR**, the **study level coefficient for doctoral programmes is 3** and the social funding of one study place for doctoral programmes is VIAA the study cost **coefficient for the doctoral programme "Civil Engineering" is 1.85** (coefficients for each thematic area of education are different, they are stipulated in the Cabinet Regulations No.994 "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"). Thus, the **total cost per student in the doctoral programme "Civil Engineering" is 10043.88 EUR**. In the 2019/2020 study year, the tuition fee in the program was 2620 EUR for Latvian students and 4000 EUR for foreign students.

For comparison, the changes in state funding by years in the doctoral study programme "Civil Engineering" in the reporting period are shown in the graph (Fig. 5).

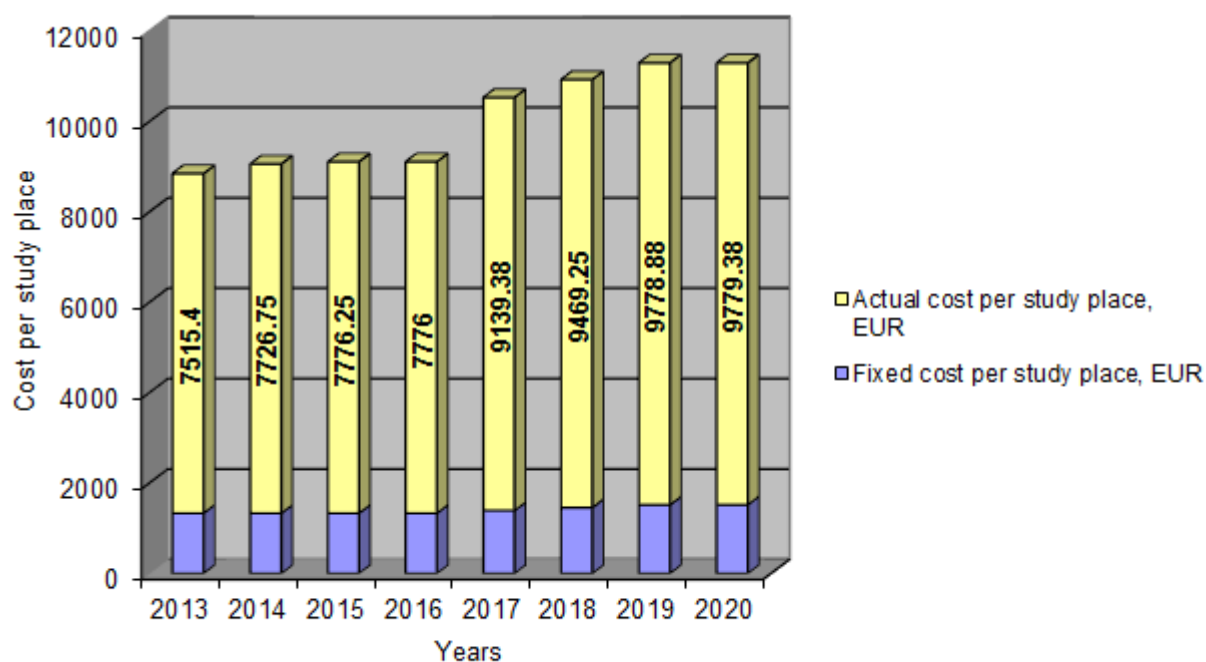


Fig. 5 State funding in the doctoral study programme "Civil Engineering"

Financial support from the state has increased during the reporting period, but so have expenditures, the minimum wage rate and other economic indicators. Paid students do not cover the state-paid budget places, because tuition fees for similar study programmes in the field of education in Latvia are not yet close to the state funding, so it would not be competitive to determine it this way, but the paid places of the study programme includes only students with study debts. In doctoral programmes students usually study in budget places.

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are other costs, of which 20% are at the disposal of the faculty that implements the respective study programme. The amount of funding for the scientific base is calculated and allocated annually in accordance with the active research results. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the doctoral study programme “Civil Engineering” consists of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Additional financial support opportunities for students in the programme

State scholarships in the doctoral study programme amount to 113.83 EUR per month in doctoral studies, which are awarded to 6 doctoral students in one study year. Thus, usually all doctoral students have the opportunity to receive scholarships. However, this support is not sufficient for full-fledged research, therefore in recent years LLU has started work on developing a new model of doctoral studies, but, in parallel, since 2018 LLU doctoral students and degree applicants have the opportunity to receive a grant from the LLU programme “Strengthening Scientific Capacity of LLU” and “Implementation of fundamental research at Latvia University of Life Sciences and Technologies”, where it is possible to apply for funding for research through a competition. Five doctoral students of the programme have used this opportunity. As far as possible, financial support for participation in conferences and publication of research results is also provided from the funding of the Faculty of Environment and Civil Engineering.

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).

The three departments directly involved in the study programme (Department of Structural Engineering, Department of Architecture and Building and Department of Land Management and Geodesy) in cooperation with other structural units of the university **fully provide the study and science base for research** for the number of doctoral students in the programme (6-10). Attention is paid to the modernization and regular renewal of premises and equipment. The scientific laboratories of the departments have purchased and mastered equipment for research in sub-disciplines, which has already been implemented for several years. For example, the equipment purchased in the Research Laboratory of Structural Engineering for steel-fibre concrete model testing provided an opportunity to obtain funding for post-doctoral research and to attract new doctoral students. Similar development takes place at the Department of Architecture and Construction, where, as a result of the defended doctoral thesis, the discipline of acoustic research of building materials and constructions is further developed and appropriate equipment is purchased. In recent years, the Department of Land Management and Geodesy has been developing the direction of remote sensing technologies and precise geodetic surveying, developing the GIS Competence Center and the Geodetic Instruments Calibration Laboratory.

Resources of other LLU faculties and laboratories are available and can be used to ensure research, for example, a doctoral student who focuses on fire resistance research of building materials and structures can use the scientific laboratory equipment of the Department of Wood Processing of the Forest Faculty or cooperate with the Forest and Wood Products Research and Development Institute. Information on available scientific equipment at LLU is compiled in a single database and is freely available at <https://www.llu.lv/lv/zinatniska-inventara-datubaze> (only in Latvian).

If necessary, **other structural units may also participate in the supervision of individual doctoral thesis**. In turn, a professor from the Faculty of Information Technology was invited to lead the research of a foreign doctoral student, where the emphasis was on the application of specific statistical methods in data analysis. **The laboratory also has several devices for joint use with researchers from Riga Technical University:** *Controls* concrete cutter and concrete saw with table for sample preparation for testing, as well as *Controls* equipment for steel bar bending tests.

In the field of science, co-operation and exchange of resources, mainly intellectual resources and information, takes place with other universities, most often with colleagues from the Riga Technical University, inviting them to review scientific articles and doctoral theses, as well as including them in the promotion council.

The informative, intellectual and material and technical base resources of Riga Technical University (for example, borrowing of measuring devices, etc.) are also used in the research activities of LLU doctoral studies in civil engineering, which are not documented.

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.

Since 2013, there have been **significant changes in the composition of the academic staff** involved. Three senior professors have given their place to their new colleagues, who are successfully continuing and expanding the development of topics started in their doctoral research. Today 15 lecturers, including 9 professors and 3 associate professors, who are elected academic staff, as well as lecturers-specialists with high competence in their fields, are involved in teaching the study courses of the doctoral study programme “Civil Engineering” and in the supervision of doctoral research. Not all teaching staff are involved in the study process every year, because there are separate teaching staff who only supervise doctoral theses. Therefore, if in a given year the teaching staff does not supervise the development of the doctoral thesis, then he or she is not included in the total workload of the academic staff implementing the doctoral programme. Changes in the composition of the teaching staff and the study courses conducted in the reporting period are reflected in *Table 3* (more detailed in *Appendix No.6*).

Table 3

Academic staff and related study courses of doctoral study programme “Civil Engineering” (2013-2020)

Study course	2013	2020
	Scientific degree, academic position	
Scientific research methodology	Dr.habil.sc.ing, prof.	Dr.sc.ing., prof.

Research planning and data analysis	Dr.habil.sc.ing, prof.	Dr.sc.ing., prof.
English for Research Professionals/ German for Research Professionals	Dr.paed., asoc.prof.	Dr.paed., asoc.prof.
Multivariate Data Analysis I		Dr.sc.ing., prof.
Multivariate Data Analysis II		Dr.agr., prof.
Preparation of scientific papers		Dr.agr., prof.
Structural Engineering	Dr.habil.sc.ing. prof.	Dr.sc.ing., asoc.prof.
Cement composites and composite structures	Dr.habil.sc.ing. prof.	Dr.sc.ing., asoc.prof.
Timber Engineering	Dr.sc.ing., prof.	Dr.sc.ing., prof.
Construction Materials and Technologies	Dr.sc.ing., prof.	Dr.sc.ing., prof.
Technology of Heat Insulation and Acoustic Materials and Products	Dr.habil.sc.ing. prof.	Dr.sc.ing., prof.
Modelling and Design of Engineering Systems / Engineering Systems of Heat, Gas and Water Supply	Dr.sc.ing., prof.	Dr.sc.ing., prof.
Structural Analysis		Dr.sc.ing., doc.
Climate control systems and their operation		Dr.sc.ing., prof.
Geodesy and Geoinformatics		Dr.sc.ing., prof.
Precise Geometrical Levelling		Dr.sc.ing., prof.
Real Property Management		Dr.oec., prof.

In order to promote succession in research and replacement of academic staff, **doctoral students**

are involved in academic and scientific work. Doctoral students work with students of Bachelor's and Master's study programmes. In general, 2-3 doctoral students of the programme are involved in the work of the Department of Structural Engineering, the Department of Architecture and Building and the Department of Land Management and Geodesy each academic year. Also, it should be noted that in order to promote further involvement of doctoral students and scientific degree applicants in research and academic work at LLU, and at the same time increase the number of LLU academic staff with doctoral degrees and form succession in the scientific directions implemented at the university, in the framework of the project "Development of the LLU Academic Staff" (No. 8.2.2.0/18/A/014), in the academic year of 2020, one doctoral student of the Civil Engineering doctoral programme was involved in the academic work. Even after the implementation of the project activity, the doctoral student continues to work at LLU as a lecturer and research assistant. It is also positive that 3 out of 4 Doctors of Civil Engineering who defended their theses in the reporting period continue to work at the university after obtaining the degree of a Doctor of Science and have become well-known scientists in the field, elected associate professors, professors and leading researchers. They regularly transfer their knowledge to students, working with them in classes, in research and in the development of their final theses, as well as develop the research environment at LLU and cooperate in research with industry organizations and entrepreneurs.

The changes in the teaching staff implemented during the reference period have had a positive effect on the diversity of study course content and doctoral thesis topics, which resulted in a slight increase in the number of doctoral students.

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.

15 lecturers, including 9 professors and 3 associate professors, who are elected academic staff, as well as lecturers-specialists with high competence in their fields, are involved in teaching the study courses of the doctoral study programme "Civil Engineering" and in the supervision of doctoral theses. Most of the faculty of the programme are also leading researchers in the field of Civil and Transport Engineering or related fields. Such composition of teaching staff allows to provide an **independent doctoral council** of the LLU in the Sub-field of Civil and Transport Engineering. **The specifics of the supervised study courses correspond to the field of research of the teaching staff.** Supervisors of doctoral theses work on the same or related sub-discipline topics that the doctoral student is researching. Also, the work of doctoral dissertation supervisors in contract work with industry companies and in research projects, involving also doctoral and Master's students in their implementation, promotes the development of a better understanding of the current needs and trends of the industry. Supervisors of doctoral theses involve their doctoral students in scientific projects. The experience gained in projects and research, which is transferred by lecturers to doctoral students, ensures the implementation of research on a scientific basis developed for years, increasing their scientific quality. This is in line with the overall goal of the programme - to prepare comprehensively educated researchers, teachers, entrepreneurs and

administrative specialists, as well as the strategic goal - to dynamically develop the field of civil engineering at the LLU within the Latvian higher education system.

Three experts approved by the Latvian Council of Science in the field of civil and transport engineering participate in the implementation of the programme, who have also obtained a doctoral degree in this field, which meets the requirements of the Law on Higher Education Institutions for academic staff to implement the academic doctoral programme.

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 total number of scientific publications of the academic staff involved in the implementation of the doctoral study programme "Civil Engineering" in the reporting period 2013-2020 reaches 188 bibliographical items. In the *Appendix No.7*, a list of publications developed by academic staff of the programme and cited in the SCOPUS and / or WoS databases (in total - 66 indexed articles) is available. By evaluation according to the *Field-Weighted Citation* index declared by the SCOPUS database, the following publications are more recognized:

1. Mathematical modelling of heat transfer problem for two layered gypsum board products exposed to fire/ Aivars Aboltins, Harijs Kalis, Kristaps Pulkis, **Juris Skujans**, Ilmars Kangro// 16th International scientific conference "Engineering for rural development": proceedings, Jelgava, Latvia, May 24 - 26, 2017 [online]/ Latvia University of Agriculture. Faculty of Engineering. Latvian Academy of Agricultural and Forestry Sciences.- Jelgava, 2017- Vol.16, p. 1369-1376. DOI: 10.22616/ERDev2017.16.N312- ISSN 1691-5976 (SCOPUS, Web of Science)
2. Increasing fire proofness of sapropel and hemp shives insulation material/ Stanislavs Pleiksnis, **Juris Skujans**, Edmunds Visockis, Kristaps Pulkis// 15th International scientific conference "Engineering for rural development": proceedings, Jelgava, Latvia, May 25-27, 2016 [online]/ Latvia University of Agriculture. Faculty of Engineering.- Jelgava, 2016.- Vol.15, p. 403-408 (SCOPUS, Web of Science)
3. Sustainable construction in Latvia- opportunities and challenges/ **Sandra Gusta**// 15th International scientific conference "Engineering for rural development": proceedings, Jelgava, Latvia, May 25-27, 2016 [online]/ Latvia University of Agriculture. Faculty of Engineering. - Jelgava, 2016. - Vol.15, p. 1291-1299 (SCOPUS, Web of Science)
4. Evaluation of hemp (*Cannabis sativa* L.) quality parameters for building material from foam gypsum products/ Ilmars Preikss, **Juris Skujans**, Aleksandrs Adamovics, **Uldis Iljins**// Chemical Engineering Transactions.- Vol.32: Proceedings of the 11th International conference on chemical and process engineering; (2013), p. 1639-1644. DOI: 10.3303/CET1332274 (SCOPUS, Web of Science)
5. Assessment of semi-rigidity of dowel type knee joint between timber elements/ **Lilita Ozola**, Janis Fabriciuss// IOP Conference Series: Materials Science and Engineering.- Vol. 471: 4th World Multidisciplinary Civil Engineering, Architecture, Urban Planning Symposium (WMCAUS 2018); (2019), 052073. DOI: 10.1088/1757-899X/471/5/052073- ISSN 1757-899X (SCOPUS, Web of Science)

6. Relationships in creep development of timber beams under natural environmental conditions/ **Lilīta Ozola**, Aivars Brokans// New developments in structural engineering and construction: seventh International structural engineering and construction conference, Honolulu, Hawaii, June 18-23, 2013/ University of Hawaii at Manoa.- Singapore: Research Publishing Services, 2013.- Vol.1, p. 773-778 (SCOPUS)
7. European vertical reference system influence in Latvia/ **Celms**, I.Reķe, A.Ratkevičs// IOP Conference Series: Materials Science and Engineering.- Vol.96: International conference "Innovative Materials, Structures and Technologies"; (2015), 1.pdf. DOI: 10.1088/1757-899X/96/1/012038. (SCOPUS, Web of Science)

Patents

Acoustical finishing board and method for its manufacturing / Juris Skujāns (LV), Raitis Brencis (LV), Andris Šteinerts (LV), Edmunds Korzunovs (LV), Kristaps Puļķis (LV); Latvia University of Agriculture [No. 15085 B: international qualification index E04B1/86, E04B9/04, G10K11/16: No.5 (2016), pp.720.-721.

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).

Faculty members lead and participate in research and scientific-practical projects, see *Appendix No.8*. Finances for the development of the projects are attracted from different funds and programmes, for example, The State Education Development Agency (VIAA), European Regional Development Fund (ERDF), The Ministry of Environmental Protection and Regional Development (VARAM), European Social Fund (ESF), Ministry of Agriculture (ZM), The Central Finance and Contracting Agency (CEFLA) and funds of Latvia University of Life Sciences and Technologies, as well as funding granted by public administration institutions and several construction companies for scientific and practical research, which is acquired in the project format in cooperation with the Technology and Knowledge Transfer Department of LLU. All research projects granted from the LLU research programme "Strengthening Scientific Capacity of LLU" are direct contribution to the support of doctoral research topics (conferences, material tools, equipment).

In total, more than 3 million euros have been absorbed, of which 2.86 million are from VIAA, ERDF and ESF funds, 75 thousand have been obtained from company orders and 67 thousand - from the LLU budget. Illustration of resource distribution in *Figure 6*.

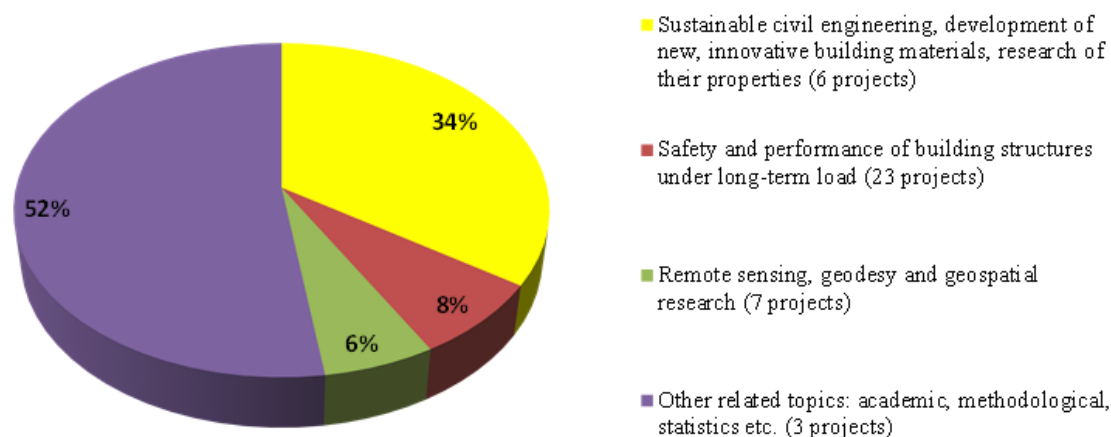


Fig. 6. Distribution of project resources in priority directions of engineering sciences

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 of the civil engineering programme participates in scientific projects at a national level, as well as conducts scientific research within the budget of the LLU, as evidenced by the list of scientific publications in *Section 4.3.* and the *Appendix No. 7* and list of research projects in the *Appendix No.8*. Thematics of research projects and scientific articles developed by the academic staff of the Programme are related to the priority directions included in the LLU Development Strategy 2015-2022: Sustainable civil engineering, development of new, innovative building materials, research of their properties; Safety and performance of building structures under long-term load and Remote sensing, geodesy and geospatial research (*Fig.7*).

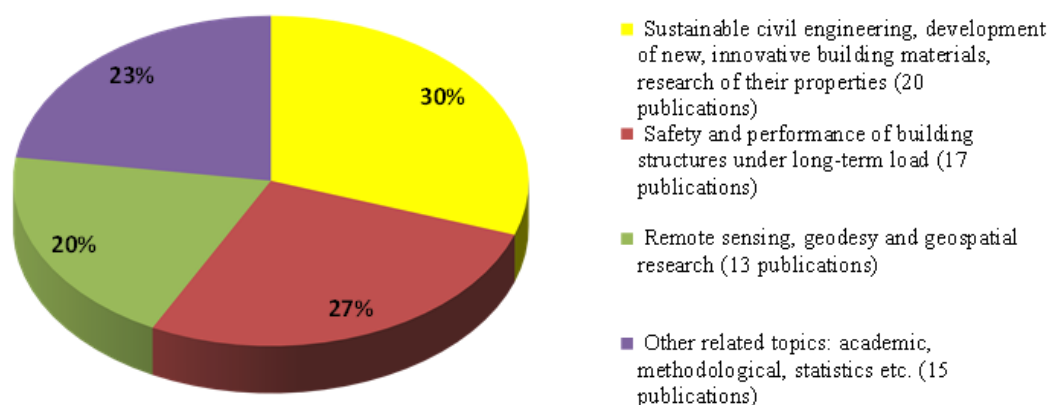


Fig.7 Scientific articles and publications developed by the academic staff of the Programme in priority directions of engineering sciences

The teaching staff, both individually and together with doctoral students, participates with reports in international scientific conferences in the fields corresponding to the content of the study programme of civil engineering, including popular networking events. For example,

participation with reports:

- International Association for Bridge and Structural Engineering – IABSE in Madrid (2014), Vancouver (2017), Christchurch (2020-21 online)
- International Structural Engineering and Construction Conference ISEC in Honolulu (2013), Istanbul (2016), Chicago (2019)
- 1st Pan American Congress on Computational Mechanics- PANACM 2015 in Buenos Aires in 2015
- International Conference on Safety and Durability of Structures, in Wroclaw (2014), Porto (2016), Jelgava (2018)
- International Conference on Chemical & process Engineering in Milan (2014, 2015)
- International Association of Geodesy Europe Subcommittee (EUREF) symposium of 2019 in Tartu
- International Scientific and Technical Conference GEOFORUM in Lviv (2018)
- World Multidisciplinary Civil Engineering - Architecture - Urban Planning Symposium in Prague (2018)

and other scientific forums. Participation in international scientific conferences provides an important motivation for research activities for both the doctoral student and the professor (scientific supervisor), as it is an opportunity to present the results of their research, see their significance, find answers to unexpected questions, get acquainted with research activities of colleagues in other countries in the same or similar field of research. As a result, valuable insights for further research and contacts for cooperation are obtained.

The teaching staff of the programme participates in international professional and scientific organizations and working groups, for example:

- Green Economics Institute (GEI);
- International Association for Bridge and Structural Engineering (IABSE);
- Working Group “Advance Building Comfort & Efficiency Commissioning Certification”;
- International Federation for Structural Concrete (*fib*);
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE);
- Federation of European Heating, Ventilation and Air Conditioning Associations (REHVA).

The participation of academic staff in international professional and scientific organizations provides an opportunity to prove themselves as a representative of their profession at the international level, to be always informed about the strategic direction of the field and subsequently transfer this information to young researchers-doctoral students by appropriately choosing research topics that contribute to the achievement of local and global goals.

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 takes place by working on the improvements of the programme, as well as by cooperating in research and in the management and consulting of doctoral theses topics. The improvement of the programme is discussed in working group

discussions and / or by communicating in the e-environment. Faculty members meet individually to discuss a specific topic or discuss topics in local seminars at a departmental and interdepartmental level. Cooperation between the teaching staff within the study program is mainly subordinated to the research topic of the doctoral student. The lecturers of the theoretical courses of the programme communicate with the supervisors of the doctoral theses in order to specify the individual tasks in accordance with the topic of the doctoral thesis.

As at 01.10.2020, in the doctoral programme Civil Engineering, **the ratio of the number of students and teaching staff** in full-time studies is 5.2.

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	1_appendix_statistics_ENG.pdf	1_pielikums_statistika_LV.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	2_appendix_BUVZ_mapping_study_courses_ENG.pdf	2_piel_BUVZ_stud_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	3_study_plans.rar	3_studiju_plani.rar
Descriptions of the study courses/ modules	4_appendix_study_courses_description.rar	4_piel_studiju_kursu_apraksti.rar
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	Doktora_diploms_Būvzinātne_EN.pdf	Doktora_diploms_Būvzinātne_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	agreement_RTU_LLU.rar	vienosanas_RTU_LLU.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_apliecinajums_Arhtektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhtekturas_un_buvniecibas_studiju_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_apliecinajums_Arhtektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhtekturas_un_buvniecibas_studiju_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_apliecinajums_Arhtektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhtekturas_un_buvniecibas_studiju_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_apliecinajums_Arhtektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhtekturas_un_buvniecibas_studiju_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.	dokt_stud_progr_Būvzinātne_AIP_atzinums_EN.docx	dokt_stud_progr_Būvzinātne_AIP_atzinums.docx

Landscape Architecture and Planning (43581)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Landscape Architecture and Planning</i>
Education classification code	<i>43581</i>
Type of the study programme	<i>Academic bachelor study programme</i>
Name of the study programme director	<i>Natalja</i>
Surname of the study programme director	<i>Nitavska</i>
E-mail of the study programme director	<i>natalja.nitavska@llu.lv</i>
Title of the study programme director	<i>Dr.arch.</i>
Phone of the study programme director	
Goal of the study programme	<i>The objective of the Bachelor's study programme is to provide students with the set of knowledge and skills necessary to start practical activity in the field of landscape architecture under the guidance of a certified specialist or to continue studies in the professional Master's study programme to obtain the professional qualification of a landscape architect.</i>
Tasks of the study programme	<i>The content of the study programme envisages: to acquire art study courses that ensure imaginative and creative thinking; to acquire humanities, natural sciences and ecology study courses that ensure the understanding of people and the environment; to acquire modern design methodology and project development and design techniques. To reflect the acquired theoretical knowledge and practical skills in the Bachelor's thesis.</i>
Results of the study programme	<i>Planned study results - graduates of the study program:</i> <ul style="list-style-type: none"> <i>• are able to perform preliminary survey of the territory, summarizing the information regarding natural and anthropogenic factors, as well as regarding the nature of construction;</i> <i>• are able to develop the functional zoning of the landscape territory, the compositional idea in accordance with the preliminary survey of the territory, functional requirements and work task;</i> <i>• are able to develop a territory improvement and greenery design for public and private outdoor space, including road and area planning, greenery plan, vertical and horizontal connection plans, improvement element plan, volumes and specifications of works and materials, as well as project documentation at all stages of the design;</i> <i>• are able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.</i>
Final examination upon the completion of the study programme	<i>State Exam</i>

Study programme forms

Full time studies - 3 years, 6 months - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	<i>3</i>

Duration in month	6
Language	latvian
Amount (CP)	140
Admission requirements (in English)	General secondary education or vocational secondary education. Passed entering examination in drawing in pencil drawing technique (by hand).
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Bachelor Degree of Engineering in Architecture and Urban Planning
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, 6 months - english

Study type and form	Full time studies
Duration in full years	3
Duration in month	6
Language	english
Amount (CP)	140
Admission requirements (in English)	General secondary education or vocational secondary education. At least B2 level of English language skills. A Portfolio of at least 4 still life drawings in pencil drawing technique (by hand).
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Bachelor Degree of Engineering in Architecture and Urban Planning
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

During the reporting period, significant changes were made and approved in the study programs in the field of landscape architecture and planning at Latvia University of Life Sciences and Technologies (hereinafter - LLU). By the LLU Senate decision of 8 February, 2017 No. 9-68 "On changes in the professional higher education Bachelor's study program Landscape Architecture and Planning and the academic Master's study program Landscape Architecture" as well as with the Higher Education Centre (AIC) decision No. 6/12/2017 No. 2017/11-142 approved the changes to the professional **Bachelor's study program "Landscape Architecture and Planning"** (education classification code 43581) in the field of study "Architecture and Construction" (Table 1).

Table 1

Changes approved in the Bachelor's study program "Landscape Architecture and Planning"

General description of the study programme	Situation before changes were made	After the changes (current situation)
<i>Language of the study programme implementation:</i>	Latvian	Latvian/ English
<i>Type and level of the study program:</i>	Second level professional higher education Bachelor's study programme	Academic education Bachelor's study programme
<i>Republic of Latvia education classification code IKK:</i>	43581	43581

<i>Volume of the study program in credit points (CP and their equivalent ECTS):</i>	200 (300 ECTS)	140 (210 ECTS)
<i>Duration of studies:</i>	5 years (10 semesters)	3.5 years (7 semesters)
<i>Degree to be obtained:</i>	Professional Bachelor's degree in landscape architecture	Bachelor Degree of Engineering in Architecture and Urban Planning
<i>Qualification to be acquired and its level:</i>	Qualification of a Landscape Architect (Level 5)	Not applicable

The study program complies with the Cabinet Regulations of 13 May 2014 No. 240 "Regulations on the State Academic Education Standard" <https://likumi.lv/doc.php?id=266187> (only in Latvian) (Appendix No.1).

In 2009, the study programme of landscape architecture received the **international accreditation of EFLA (European Federation of Landscape Architects)**, which, at the same time, became the basis for the need for changes in both Bachelor's and Master's studies. In the accreditation sheet, the experts acknowledged the contents of the programme complies with the requirements for the education of landscape architects and the definition of the profession of a landscape architect, however, they have called for changes in the regard to the **form of the study in accordance with the Bologna Process** (*European Higher Education Area, declaration of the European Ministers of Education of 19 June 1999 in Bologna*), **so that the programmes can continue to be internationally recognized.**

In order to identify and implement the necessary changes in both Bachelor's and Master's programmes, in recent years the teaching staff of the Department of Landscape Architecture and Planning of the LLU has been involved in several councils and commissions related to landscape architect education standards in Europe and the world, for example, ECLAS (*European Council of Landscape Architecture Schools*) and EBANELAS (*Eastern Baltic Network of Landscape Architecture Schools* <http://www.ebanelas.org/>).

Therefore, the changes currently approved in both programmes are based on:

- The basic principles of the Bologna process, which recommend the form of study implementation to be 3 years for basic studies and 2 years for the Master's degree <http://www.aic.lv/portals/izglitiba-latvija/bolonas-process-latvija> (in Latvian);
- Recommendations of the International Federation of Landscape Architects (*IFLA/ Unesco charter for Landscape Architectural education; Guidance document for recognition or accreditation*) https://lnicollab.landscape-portal.org/goto.php?target=cat_1305&client_id=main;

- The Education Standard for Landscape Architects developed by ECLAS (European Council of Landscape Architecture Schools) (*ECLAS Guidance on Landscape Architecture Education*) <https://www.eclas.org/eclas-education-guide/>;
- Findings and recommendations gained within the EBANELAS project regarding the form of implementation of the existing study programs (<https://www.facebook.com/Ebanelas-205603633183585/>).

During the reporting period, **the degree to be obtained in the study programme was specified**, which was changed from Bachelor of Engineering in Landscape Architecture to a *Bachelor Degree of Engineering in Architecture and Urban Planning*. This is also in line with the Cabinet Regulations of 13 May 2014 No. 240 “Regulations on the State Academic Education Standard”.

Other parameters of the Academic Bachelor's study program Landscape Architecture and Planning **have not changed** since the approval of the major changes in the programme in 2017.

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 enrolled students is influenced by the number of state-funded budget places, the total capacity of the study programme and the demand of the industry. The average number of enrolled students varies from 25 to 30 students each year, which is optimal for a high-quality implementation of the study programme and the demand of the industry. During the reporting period, the distribution of the number of students in the Bachelor's study programme by courses varies on average from 23-25 people in each course (*Fig.1*). It should be noted that after the changes implemented in the Bachelor's study programme in 2017, reducing the duration of studies from 5 to 3.5 years, the planned 4th and 5th course student places were redistributed to the Master's study programme to equalize the number of students in one course in Bachelor's and Master's study programmes. In general, the planned number of students in the programme provides an opportunity for successful students to study at the expense of the state budget, but those students who have academic debts study at their own expense.

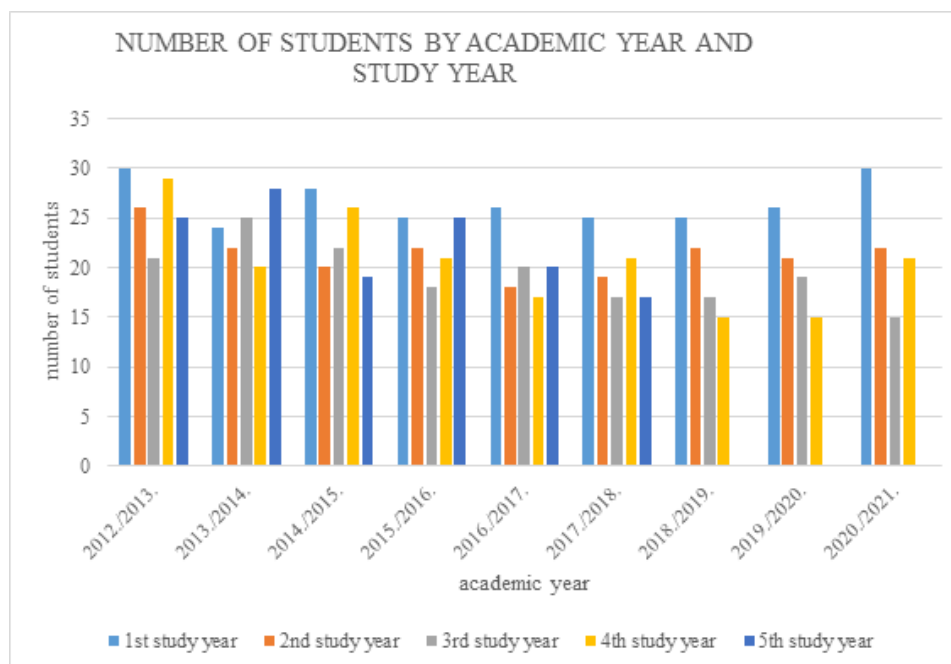


Figure 1 Number of students by study years each academic year

Every year, an average of 14 - 26 students graduate from the study programme. In the academic year of 2017/2018, due to changes in the study programme, two graduations took place in one study year. The drop-out rate in the study programme is on average 5-7 people during the whole study period. Students drop out mainly in the first two courses, when students change their field of study due to personal reasons or are forced to leave their studies due to family circumstances. The study programme is implemented in English only since 2018, thus currently the number of students in the English language group is still small. In the winter graduation of 2020, the first two English language students graduated from the study programme, moreover, one of them with excellence. Statistical data on students of the Academic Bachelor's study programme "Landscape Architecture and Planning" are available in *Appendix No.2*

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.

Landscape architecture education in Latvia can be obtained only at LLU. Studies in landscape architecture were started simultaneously with the establishment and development of this whole field of landscape architecture in Latvia in 1994, forming and still continuing close cooperation with the Latvian Association of Landscape Architects (formerly Latvian Society of Landscape Architecture, established in 1995).

The academic Bachelor's study program "Landscape Architecture and Planning" is the first of two consecutive study programmes that generally provides the education necessary for obtaining professional qualifications and the right of independent practice in landscape architecture.

The title of the study program "Landscape Architecture and Planning" is based on the professional standard of the profession of a landscape architect and the guidelines and descriptions of the field defined in the European Landscape Conventions (from the European Landscape

Convention: “landscape planning” means consequent future-oriented actions to improve, restore or create new landscapes).

The profession of a landscape architect is associated with in-depth knowledge and abilities to depict landscape projects in a graphical way, thus it is related to the admission requirements in the program - a successful **entrance examination** organized by LLU, where applicants' skills in hand drawing are tested each year by the commission established by the Landscape Architecture Planning department. The evaluation is given in points and is added to the other mandatory evaluations forming the total amount of points in the entry competition. An entrance examination “Drawing” in the study programme “Landscape Architecture and planning” was included long ago, it was already in the accreditation of 2013. During this reference period LLU did not apply to the Council of Higher Education for an individual approval for this entrance examination. Prior to the adoption of the LLU admission regulations for 2022/2023 academic year, the approval from the Council of Higher Education will be obtained until November 30, 2021.

The **aim** of the Bachelor's study programme is to provide students with the set of knowledge and skills necessary to start practical activity in the field of landscape architecture under the guidance of a certified specialist or to continue studies in the professional Master's study programme to obtain the professional qualification of a landscape architect. The content of the study programme envisages: to acquire art study courses that ensure imaginative and creative thinking; to acquire humanities, natural sciences and ecology study courses that ensure the understanding of people and the environment; to acquire modern design methodology and project development and design techniques. To reflect the acquired theoretical knowledge and practical skills in the Bachelor's thesis.

Table 2

Analysis of study results in accordance with the aims and tasks of the qualification

(Prepared for both Bachelor's and Master's programmes, taking into account the integration and succession of both study programmes for obtaining the professional qualification of a landscape architect)

Objectives and tasks of the qualification in accordance with the professional standard	Study results of the Master's programme	Study results of the Bachelor's programme
research, analysis, development, preservation, restoration and management of public and private outdoor facilities and greenery;		able to perform preliminary survey of the territory, summarizing the information regarding natural and anthropogenic factors, as well as regarding the nature of construction;

evaluates and studies the interaction of spatial structures in the landscape and landscape elements;		able to develop the functional zoning of the landscape territory, the compositional idea in accordance with the preliminary survey of the territory, functional requirements and work task;
assesses the impact of foreseeable changes on the landscape;	able to apply the acquired academic knowledge in solving the ecological, aesthetic and social problems of the landscape in preserving the cultural and natural heritage and ensuring the sustainability of the landscape;	
develops guidelines, methodologies, recommendations for landscape protection, preservation and restoration;	able to develop guidelines, methodologies, recommendations for landscape management, protection, conservation and restoration;	
develops projects for the restoration or reconstruction of cultural and historical and degraded landscapes and territories;	able to understand the importance of cultural and historical landscape and natural heritage in the development of the national economy;	
develops landscape and public outdoor space compositional planning and spatial structure, functional and compositional solutions for the improvement of territories and greenery, technical solutions, working drawings and specifications;		able to develop a territory improvement and greenery design for public and private outdoor space, including road and area planning, greenery plan, vertical and horizontal connection plans, improvement element plan, volumes and specifications of works and materials, as well as project documentation at all stages of the design;

advises designers, participants in the construction process and residents on the issues of landscaping, territory improvement and greenery development and preservation.	able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.	able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.
	able to solve scientific and practical problems of the field in consulting and design institutions and enterprises, state and local government institutions;	

Together, both study programmes (bachelor and master) fully meet the qualification goals and tasks set for the profession of a landscape architect (*professional standard*) (Table 2), but the **professional qualification of a landscape architect** itself is to be granted after the completion of Master's level studies. A professional standard of a Landscape Architect available here: <http://www.aiknc.lv/standarti/AinavuArhit.doc> (only in Latvian), as well as translated version of the standart available in the *Appendix No.8*.

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 topicality of the landscape architect's work is defined by several international and Latvian level documents and organization, as well as the LLU development strategy for 2015-2022. Topical issues of the field, labor market and science in the field of landscape architecture and planning are regularly discussed within various networks, commissions, working groups, during scientific and practical conferences and seminars, implementation of research projects, in which the LLU Department of Landscape Architecture and Planning actively participates. The teaching staff of the department also participates and closely cooperates with professional organizations in the field (*Council of Construction Industry Experts (NEP), Latvian Association of Landscape Architects, Riga Council of Monuments, etc.*). The current issues of the field and research in several groups and their connection with the study courses and activities implemented in the study programme are

summarized below (Table 3).

Study plans to be implemented in Latvian and English are provided in the *Appendix No.3.1* and *Appendix No. 3.2*.

Table 3

Assessment of the topicality and compliance of the content of study courses / modules with the needs of the labour market and scientific trends

Industry, labour market and science trends / organizations and stakeholders	How is the content of study courses included and updated in accordance with the development trends of the industry, labour market and scientific development
<p>International educational organizations in landscape planning and management - <i>IUNISCAPE European Network of Universities for the Implementation of the European Landscape Convention; ECLAS European Council of Landscape Architecture Schools; EBANELAS Eastern Baltic Network of Landscape Architecture Schools; LE-NOTRE INSTITUTE</i> - basically define educational norms and standards for obtaining the qualification of a landscape architect.</p> <p>Joint events with foreign universities, meetings, exchange of experience.</p>	<p>The teaching staff and the director of the study programme regularly attend international conferences (ECLAS) with reports, participate in the meetings of several committees and international educational projects (EBANELAS) aimed at improving the study programme, as well as in editorial boards of scientific and methodological publications or reviewing scientific works.</p> <p>Through these activities, not only the study programme is improved, but the study methods are actively improved, taking over the experience from foreign colleagues, as well as sharing and discussing our own experience.</p> <p>By communicating and sharing experience on current education issues with partner universities in Europe, Russia and other countries of the world, participating in ERASMUS exchange programs and inviting colleagues with guest lectures to our students, the latest teaching methods are identified, the form and content of studies are improved.</p>

<p>International landscape, cultural heritage, research and environmental organizations - <i>United Nations Educational, Scientific and Cultural Organization; CDCPP The Steering Committee for Culture, Heritage and Landscape; HEREIN GARDEN; NELA Network of European Landscape Architecture Archives; CIVILSCAPE; DOCOMOMO ISC / Urbanism and Landscape; PECSRL Permanent European Conference for the Study of the Rural Landscape; ICOMOS-IFLA International committee on Cultural Landscapes</i> - guidelines for the preservation, planning and management of cultural landscape, policy and competence of a landscape architect in these issues have been defined. At this level, there is a relatively large number of documents at the international level that determine the protection and development of the cultural landscape as a whole.</p>	<p>Faculty and industry (LAAAB) act as members of various networks and associations. The teaching staff has extensive research in the field of cultural and historical landscapes, which is related to the current issues of international organizations, and is integrated into study courses. Through these activities, knowledge, research and involvement have been strengthened directly on an international scale, integrating newly acquired knowledge and current topics in the study courses. Students have the opportunity to get acquainted with all international level documents in several study courses.</p>
<p>International landscape architecture and planning industry networks and professional organizations - <i>IFLA International Federation of Landscape Architects; IFLA EUROPE European Region of International Federation of Landscape Architects; ELCA European Landscape Contractors Association; ISOCARP International Society of City and Regional Planners; BSRLA Baltic Sea Region Landscape Architecture Group</i> - define the topical issues of industry professionals and guidelines for their solution, unites professionals in the field of landscape architecture.</p>	<p>Faculty and the director of the study programme regularly attend international conferences (IFLA) presenting their reports. Representatives of the industry are involved in various networks and associations. Thanks to the cooperation with LAAAB, there is a flow of information about current events, and the teachers themselves are members of the association and actively participate in various meetings and conferences initiated by the industry. Through these activities, closer co-operation with the industry is formed at an international level, as well as the integration of current world and European level landscape architecture issues and topics into study courses.</p>

Latvian professional organizations, commissions, networks in the field of landscape architecture and planning -

Latvian Association of Landscape Architects (LAAAB) <https://www.laaab.lv/> (in Latvian) - professional organization of the landscape architecture field.

Council of Construction Experts - define the current issues of the industry, as well as define the industry's demand for graduates in the field of landscape architecture through the standards and study content of the landscape architect profession.

Riga Monuments Council - advises on the development of Riga's public outdoor space, placing special emphasis on the preservation of cultural and historical and artistic values, and their harmonious integration into the landscape of the city of Riga.

The teaching staff acts as full **members of the association** and are also members of the **certification commission**. There is a regular co-operation with the association, as well as the **organization of joint discussions** - finding out the current issues of the field and the needs for competencies and knowledge, which are appropriately supplemented by study courses. The LLU Department of Landscape Architecture and Planning, in cooperation with industry companies and professional organizations, also organizes an **Internship Day**. In the framework of it, companies in the field introduce students to the specifics of their activities, as well as gladly invite students for internship. The internship reports have been analyzed and discussed with the students, which is also the basis for the improvement of study courses.

In addition, a scientific-practical conference on landscape architecture is organized every year in cooperation with the association, where industry professionals share their experience with the students, faculty and colleagues, but university scientists share their scientific research and projects.

Faculty members, working in **industry councils**, have the opportunity to follow current events in the industry and also to actively consult colleagues in the industry.

<p>Latvian legislators and policy makers - Ministry of Environmental Protection and Regional Development, Ministry of Agriculture, Ministry of Culture, Ministry of Economics - define the framework of the law for certain industry issues - territorial development, nature protection, climate change, construction industry regulation etc. The most relevant to landscape architecture are - Law on Historic Lands (draft), European Landscape Convention, Law on Intangible Cultural Heritage, Law on Architecture (draft), Law on National Parks, Law on Protection of Cultural Monuments, Law on Specially Protected Nature Areas, Law on Tourism, Territorial Development Planning Law, Construction Law, Protection Zone Law, Road Law, European Climate Law (draft) and a number of related regulations of the Cabinet of Ministers, which define the widest range of landscape protection, planning, sustainable development and management issues.</p>	<p>By cooperating, keeping up with and participating in various events of the Ministries and policy makers, both as experts and as audience or cooperation partners, the current regulatory framework and policy guidelines are transferred to the content of study courses.</p> <p>The study programme includes regulatory requirements and current issues of the field in the study courses, as well as in the development of study courses and final theses, closely reflecting current issues in Latvia - ecological planning, biological diversity, sustainable, smart and flexible landscape planning, improving the quality of living environment, social integration, preservation and integration of cultural and historical heritage, etc. (<i>more on this in Chapter 2.5</i>).</p>
<p>Latvian-wide co-operation with universities - Riga Technical university, RISEBA, Latvia University, Bulduri Horticultural Secondary School, etc. - in implementing the professions defined by the field, perform both research and study work, and participate in Latvian-level and international projects.</p>	<p>Cooperation with other universities and educational institutions helps to define important issues of education in the field, which can be solved more effectively by organizing guest lectures, practical classes, annual <i>plein airs</i>, research and other study and scientific activities, participating in joint projects, which, in turn, is reflected in content of the study courses.</p>

<p>LLU development strategy for 2015-2022</p> <p>- as defined in the vision of the LLU, “LLU is one of the leading universities of science and technology in the Baltic Sea region, specializing in the sustainable use of natural resources and improving the quality of life of the society”.</p> <p>https://www.llu.lv/en/mission-and-vision</p>	<p>The sustainable use of natural resources for raising the quality of life of the society, defined in the vision of LLU, is the main guiding principle in the implementation of the study programme, which is closely related to the profession of a landscape architect.</p> <p>In order to realize the set goals of research and education programmes, the following has been implemented:</p> <p>The strategy of LLU defines the direction of “Urban and rural landscape research and development”, which is implemented by the Department of Landscape Architecture and Planning. The aim is to identify, preserve, develop and manage the value of the Latvian cultural landscape, including the urban and rural environment, as an essential component of national identity. This aim is implemented by the teaching staff participating in research and projects, preparing publications, as well as integrating topics and project results into the content of the study course.</p>
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In addition to define the topical issues of the industry, a **study by LLU on labour demand trends** has been carried out in the framework of the project No. 8.2.3.0/18/A/009. (<https://www.llu.lv/lv/raksts/2019-08-02/petijums-darbaspeka-pieprasijums-turpinas-parkartoties-par-labu-specialistiem-ar>) (in Latvian). The LLU study on labour demand, based on the research data of the Ministry of Economics, concludes that the demand for specialists with higher education in the sector will increase by 37% and will remain unchanged until 2030. Most data sources point to an increase in labour demand. In the long term, there will be a balance or a small deficit in the supply and demand of specialists in the labour market. The labour market demand for landscape architects is closely linked to the overall development of the construction industry. The most frequently mentioned and required skills **are honesty, responsibility, accuracy, computer skills and digital competencies, as well as communication skills** - all these skills and competencies are included in the study programme from year one, learning digital technologies, as well as learning to communicate with each other - working in groups, and improving presentation skills by presenting study papers.

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 academic Bachelor's study program “Landscape Architecture and Planning” is the first of two consecutive study programmes that generally provides the education necessary for obtaining professional qualifications and the right of independent practice in landscape architecture.

The aim of the Bachelor's study programme is to provide students with the set of knowledge and skills necessary to start practical activity in the field of landscape architecture under the guidance of a certified specialist or to continue studies in the professional Master's study programme to obtain the professional qualification of a landscape architect. The content of the study programme envisages: to acquire art study courses that ensure imaginative and creative thinking; to acquire humanities, natural sciences and ecology study courses that ensure the understanding of people and the environment; to acquire modern design methodology and project development and design techniques. To reflect the acquired theoretical knowledge and practical skills in the Bachelor's thesis.

Planned study results - graduates of the study program:

- are able to perform preliminary survey of the territory, summarizing the information regarding natural and anthropogenic factors, as well as regarding the nature of construction;
- are able to develop the functional zoning of the landscape territory, the compositional idea in accordance with the preliminary survey of the territory, functional requirements and work task;
- are able to develop a territory improvement and greenery design for public and private outdoor space, including road and area planning, greenery plan, vertical and horizontal connection plans, improvement element plan, volumes and specifications of works and materials, as well as project documentation at all stages of the design;
- are able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.

Table 4

Linking the results to be achieved in the study courses with the results to be achieved in the study programme

Results of the study programme	Linking the results to be achieved in the study courses with the results to be achieved in the study programme
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<p>able to perform preliminary survey of the territory, summarizing the information regarding natural and anthropogenic factors, as well as regarding the nature of construction;</p>	<p>acquired in the following study courses: <i>Art History of Architecture and Landscape Architecture I, II, III; Basics of Visual Spatial Modelling; Natural Landscape; Landscape Ecology and Environmental Protection; Park and Square; Architecture I, II; Single-Family Houses Territory; Introduction to Architectural Phenomenology; Environmental Psychology in Landscape Architecture; Public Building Territory; Residential Building Territory; Landscape Sociology; Bachelor Thesis; Landscape Studies; Land Surveying; Environmental object design I, II; Greenery I, II, III; Road Landscape I, II; Water Landscape; Presentation of Landscape Architecture Research</i></p> <p>Type, methods: <i>lecture materials, practical and laboratory works aimed at recognizing the style, material and properties of landscape elements, learning various methods necessary for landscape research and study, using both theoretical research methods, practical methods and modern technologies.</i></p>
<p>able to develop the functional zoning of the landscape territory, the compositional idea in accordance with the preliminary survey of the territory, functional requirements and work task</p>	<p>acquired in the following study courses: <i>Basics of Visual Spatial Modelling; Landscape Architectural Design Graphics I, II, III; Digital Tools in Landscape Projects I, II, III, IV; Natural Landscape; Professional English / Professional German I, II; Park and Square; Architecture I, II; Single-Family Houses Territory; Public Building Territory; Residential Building Territory; Legal Basis of Design; Project Management in Landscape Architecture; Bachelor Thesis; Land Surveying; Material Studies of Outdoor Spaces; Geographical Information System;s Environmental object design I, II; Greenery I, II, III; Road Landscape I, II; Water Landscape.</i></p> <p>Type, methods: <i>students acquire the material and knowledge base necessary for planning of function and composition, learning various materials and planning techniques, theories, methods applied in landscape design - through lecture materials, practical and laboratory work, excursions, developing functional zoning and compositional solutions for thematic areas. Group work, discussions and defending papers are also important at this stage.</i></p>

<p>able to develop a territory improvement and greenery design for public and private outdoor space, including road and area planning, greenery plan, vertical and horizontal connection plans, improvement element plan, volumes and specifications of works and materials, as well as project documentation at all stages of the design;</p>	<p>acquired in the following study courses: <i>Digital Tools in Landscape Projects I, II, III, IV; Natural Landscape; Professional English / Professional German I, II; Park and Square; Architecture I, II; Single-Family Houses Territory; Public Building Territory; Residential Building Territory; Legal Basis of Design; Project Management in Landscape Architecture; Bachelor Thesis; Land Surveying; Material Studies of Outdoor Spaces; Geographical Information System;s Environmental object design I, II; Greenery I, II, III; Road Landscape I, II; Water Landscape.</i></p> <p>Type, methods: <i>for students, the acquisition of knowledge and skills takes place both by acquiring theoretical material, through lectures, and in practical and laboratory works - by acquiring practical skills, both in excursions and in the end of studies, by defending works. Students acquire skills of landscaping and greenery design, working with specific areas - developing projects, in cooperation with municipalities or other investors and developers, learn the specifications of materials and greenery used, preparation of project documentation in accordance with industry requirements and the latest trends. Group work and learning the latest digital design tools and programmes is important.</i></p>
<p>able to organize the work process in cooperation with specialists in related fields, to plan and manage work, to work in a working group in accordance with the project development time schedule.</p>	<p>acquired in the following study courses: <i>Landscape Sociology; Park and Square; Architecture I, II; Single-Family Houses Territory; Public Building Territory; Residential Building Territory; Legal Basis of Design; Project Management in Landscape Architecture; Land Surveying; Material Studies of Outdoor Spaces; Geographical Information System;s Environmental object design I, II; Greenery I, II, III; Road Landscape I, II; Water Landscape; Landscape Studies; Presentation of Landscape Architecture Research</i></p> <p>Type, methods: <i>students both by working in groups in several study courses and by working independently, developing individual works in accordance with the prepared work schedule, acquire skills to work responsibly and organize all study-related processes, as well as to present works to both lecturers and municipalities.</i></p>

The mapping of study courses (Appendix No.4) shows the connection of the achievable results of each study course with the results of the study programme, which can be defined as even acquisition of the entire study programme, emphasizing the most extensive goal, which is related to landscape architecture and planning skills and competencies and which is the main goal of the qualification of a landscape architect.

Descriptions of study courses are available in the Appendix No.5.

of the information included in the study courses / modules, the results to be achieved, the set goals, etc. is realized through the gradual acquisition of the study courses, as well as the joint acquisition of project-oriented knowledge, skills and competencies. For example, in the first study course in the second term, the students take the study course “Natural Landscape”, which is closely connected with the parallel study courses - “Landscape Ecology and Environmental Protection”, “Landscape Studies” and “Geographical Information Systems”. Thus, an integrated understanding of the specifics of natural territories, their planning, protection and management is formed. Thus, the goals, tasks and achievable results of all involved study courses are based on the acquisition of a common theme / area of the industry with different approaches and tools. The whole study program is built similarly.

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 **methods** of the study programme implementation are based on the gradual and project-oriented acquisition of knowledge, skills and competencies, which are realized through the following principles:

- Study courses are designed to be as **voluminous** as possible (CP), subordinating each of them to one topic, which is comprehensively considered, integrating the related sub-topics, using different methods and inviting several lecturers. It reduces the fragmentation of study courses and topics, helps students to master the subject in a more concentrated way and with a smaller number of examinations per semester.
- **Organization of study courses** - there are always lecture materials presented by the lecturer, small tasks that successively help to master the topics or successively develop the final work / project of the study course in stages. It helps students to learn the subject gradually and continuously by testing their knowledge with the support and consultation of the teachers;
- To learn the study courses, lecturers and students use LLU **Moodle e-studies** (*especially relevant during the Covid-19 pandemic*), which helps to publish materials and video lectures for students, to conduct online lectures and seminars, students are able to submit their work, and lecturers - to publish the evaluation. Also, in this environment it is possible to provide feedback, comments on the submitted works, to communicate, as well as create a transparent and easy-to-understand e-environment for each study course, where the student can find all the necessary information about the course.
- To facilitate **communication**, an e-mail has been created for each student and lecturer at LLU, but communication with all parties involved in the study course is possible through the e-learning environment.
- The **study environment** is organized creatively - each course of the students have their own workroom in the study building at the Valdeka Manor, where they can stay and work also outside of classes, because the study programme is largely based on independent work. There is also access to computer classroom with all the necessary computer programs, large-format scanning, printing and laser cutting.

- **After each examination period, students provide their assessment** of the content of the study course and the lecturer's work, which helps to improve the content of the study course and teaching methods.

The **principles of student-centered education** in the study programme are implemented as follows:

- Respecting the needs of students, the study environment accessible to each student is ensured, the accessibility of the environment in the premises is also ensured. Students have the opportunity to attend classes and use study and scientific equipment, to use the study infrastructure also outside of classes.
- Lecturers are available for students for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail.
- Students' independent work is planned and structured (*there are reports and attestations*). Students are provided with both mandatory and additional consultations, providing the support of the lecturer.
- In order to structure the students' learning process and facilitate students' sequential and regular acquisition of the subject, study course schedules have been prepared in each study course with the topic of each week, the work to be performed and evaluated, and the conditions for the completion. At the beginning of the study course, students are introduced to the schedule and topics of classes, as well as the conditions of the completion of the study course.
- Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of reconciliation of study courses when returning from mobility (LLU Rector's Regulation No. 4.3. – 8/78 (02.22.2016.) "*On Procedure of Academic Recognition at LLU*" is available in the *Appendix No.6*).
- The review of student complaints is regulated by the LLU Study Regulations (https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf), but complaints are also reviewed by the commission. In addition, students are invited to seek assistance by escalating the issue, starting from the director of the study programme, the head of the department, vice-dean, dean and, finally, the vice-rector for studies.
- Ensuring mutual respect and participation of students and lecturers, the Code of Ethics of the LLU has been developed (https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf).
- In order to ensure the participation of students in the improvement of the study process, the director of the study programme regularly listens to the students' suggestions and explains possible solutions for improving the studies. After the changes in the study program in 2017, all students' courses had the opportunity to integrate into the modified programme, the changes were explained to the students in detail and additional information was given, each student's consent to join the modified study plan was received (*signature sheets*).
- Students studying landscape architecture participate in the improvement of the study process in cooperation with the Student Self-Government, which delegates its representatives to the Council and the Scholarship Council of the Faculty of Environment and Civil Engineering, LLU Council and Senate.
- Students participate in surveys, discussions and evaluate the study process. Discussions and meetings of lecturers and student representatives have become a tradition to discuss study programmes, the implementation methods of individual study courses and new proposals in the study process.

- Student evaluation criteria are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria when starting the specific study course.
- The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works.
- In larger study courses, assessment is performed by several lecturers, which eliminates subjectivity in assessment. The final works are evaluated by a commission of 7 people.

LLU has developed Study Regulations, which envisage the **evaluation** of students' works, using qualitative and quantitative evaluation methods:

- **For the qualitative assessment**, 10-point scale criteria are used (*1 to 10 points, successful assessment starting from 4 points*) or the pass/fail assessment. All final theses, projects and individual practical works are evaluated with a mark. Laboratory work, which is mainly performed in person, is often assessed by pass/fail (https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf). If part of the work in the study course is intended to be performed as group work, there is always also an individual work which is assessed with a mark and which has a greater decisive role in the final assessment.
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS). Every semester the student acquires study courses in the amount of 20 CPs (30 ECTS). In total, the study program is mastered if the study courses in the amount of 140 CPs (210 ECTS) have been successfully completed.
- In addition, **attendance** of the study course is controlled throughout the course. The study programme has certain requirements - attendance of classes in the amount of not less than 75%. Tests and/or course project must be submitted within the specified time limit.

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 academic study program does not provide for 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.

Topicalities of the field in connection with the content of study courses are described in more detail in *Chapter 2.1*. Below is the analysis of the topics of the final works in relation to the topicalities of the field and research, including the research directions defined in the research section of the LLU development strategy.

Reflection of topical issues of the field and in research in the final theses of the students

The main groups of topics for final theses (Fig. 2.1) are:

- Heritage landscapes (manors, castles, churches, hillforts) and Latvian natural landscapes and related issues (Baltic Sea coastal landscape, rural landscape in different regions), which are included in the European Landscape Convention on the Preservation of Landscape Values, as well as Latvia's Sustainable Development Strategy and the findings of the National Development Plan on the transfer of values to future generations.
- Ecological and aesthetic interaction of urban environment, quality of public space and living environment and research of spatial elements of rural landscape (roads, forests, water bodies, settlements), which resonate with current topics on improvement of environmental quality, adaptation to climate change, green course implementation trends, sustainable development of locations.

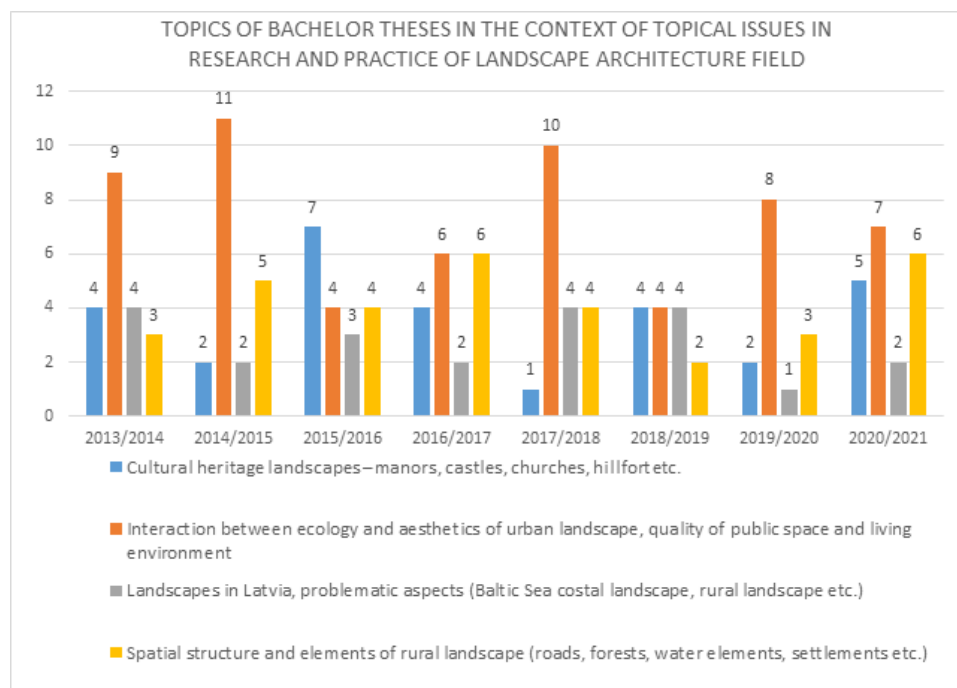


Figure 2.1 The main groups of topics for final theses

In line with the profession of a landscape architect, most of the final theses topics address the ecological and aesthetic issues of the urban environment, which overall improves the quality of the living environment of the society, in line with both the state policy goals and the LLU development strategy.

The meeting of the State Examination Committee and the defense of theses is held in person (except for the last year, when due to the Covid-19 pandemic situation defense was organized in online). Each student gives a 7 - 10 minute presentation to the committee, as well as submits a bound volume of a thesis with the theoretical part and visual graphic material of the project (members of the committee get acquainted with the works in e-studies in advance). After the presentation of the work, the student has a discussion with a reviewer, followed by reading of the review prepared by the reviewer. The student's presentation, the graphic design and the written theoretical part of the developed bachelor thesis, as well as the answers to the questions clearly depict the theoretical and practical preparation of each author of the thesis, which is assessed by each of the members of the evaluation committee in **10-point system according to the following criteria**: theoretical substantiation, compositional solution, functional solution, the quality of graphic design and presentation skills. After the public defense of bachelor's theses, evaluation of the theses and their compliance with requirements of the bachelor's degree in engineering in landscape architecture are discussed at the closed meeting of the Examination

Committee. In conclusion, the chairperson of the committee publicly announces the results of the defense of bachelor's theses to the students and those present.

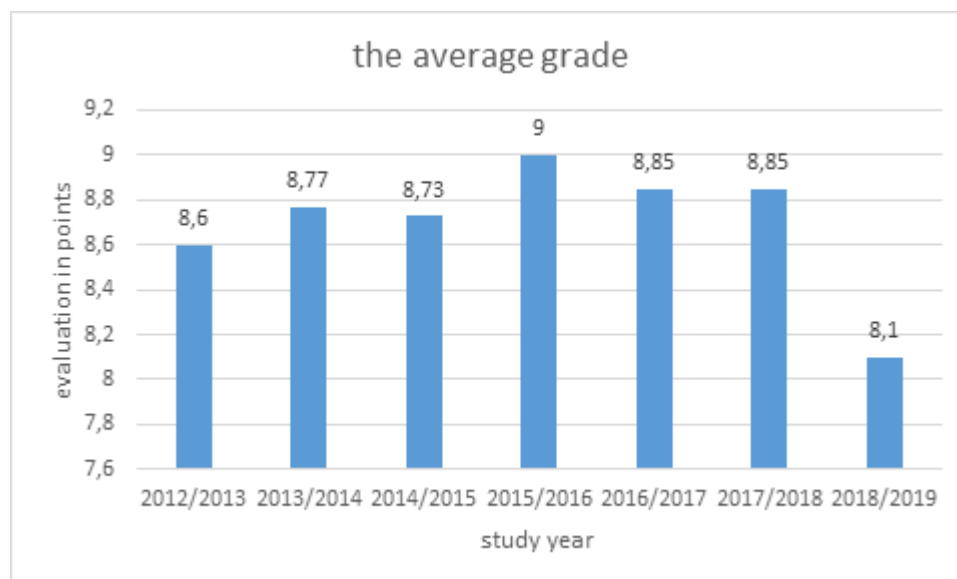


Figure 2.2 The average grade of the final theses in different study years.

The average grade of the final theses ranges from 8.1 to 9.00 points (Fig. 2.2), which is an excellent result, and is highly evaluated by the committee as good and outstanding achievements. During the accreditation period, the average grade was relatively stable.

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.

Student surveys

Student surveys have been conducted for several purposes, taking place regularly, interviewing both individual applicants and students of later years. Most often, surveys are organized centrally or on the initiative of the faculty, student self-government, as well as for the evaluation of each study course through the LLU IS system.

Question group	Analysis (changes, trends)

<p>How did students choose the study program, what motivated them, did they know their choice of the study programme before leaving secondary school?</p>	<p>Comparing the conducted surveys, it can be concluded that students know more and more which study programme they will choose in advance - this is related to the wider availability of information, which allows students to get acquainted with the content of the study programme and their future profession. In turn, the choice of LLU is still based on the priority to acquire quality education and suitable study programmes, the availability of budget places as the grounds for selecting a particular programme has decreased. It describes students as purposeful in choosing a particular profession.</p> <p>It should be noted that the profession of a landscape architect can be obtained only at LLU since the establishment of the study programme more than 27 years ago.</p> <p>These results help to more effectively prepare information about the study programme for prospective students, organize open-door events and other informative events.</p>
<p>From which regions do LLU students come to study?</p>	<p>The regional representation of students has not changed - there are still quite a lot of students from Zemgale and Vidzeme, but all regions are represented.</p> <p>These results help to understand the needs of students and the general tendencies of national competition in education, as well as to organize work on the landscape architecture projects and landscape plans.</p>
<p>Where was the information about the study programme obtained and was the information sufficient?</p>	<p>If the prospective students in the 2014 survey drew information from the LLU website, from friends, from the open door events, then in recent years (in the 2019 survey) the importance of social networks has increased. This was also facilitated by the Facebook and Instagram accounts created for the Department of Landscape Architecture and Planning (https://www.facebook.com/aaplif/ - 730 followers https://www.instagram.com/ainavu_arhitekti_llu/ - 174 followers). The information on the LLU website has also been expanded and developed in a clearer way, including videos with stories of students and graduates, as well as descriptions of study programmes:</p> <p>https://www.llu.lv/lv/pamatstudijas/ainavu-arhitektura-un-planosana (in Latvian); https://www.llu.lv/en/landscape_architecture (in English) .</p> <p>Additional information in Latvian is also available on the website of the Faculty of Environment and Civil Engineering.</p>

<p>Students' motivation to study in a specific programme at LLU</p>	<p>Career opportunities (<i>students choose study programmes with the opportunity to obtain a professional qualification</i>), as well as the average salary and prestige of the profession in the industry always remain the main motivators. More and more students choose an attractive profession and study programme. In order to popularize and strengthen the profession of a landscape architect, promote its recognition, LLU closely cooperates with Latvian municipalities and the Latvian Association of Landscape Architects (https://www.laaab.lv/ (in Latvian)) in implementing various projects and activities, including the involvement of the public and other stakeholders.</p>
<p>What risks can affect successful studies?</p>	<p>Students in the previous surveys noted their insufficient knowledge in certain topics as a risk, as well as their inability to meet study requirements or combine studies with work. In recent years, the number of working students and the number of older students (<i>who are acquiring their second degree</i>) have increased, making it increasingly difficult for students to combine studies with work, especially in senior courses, when most students already work in the industry.</p> <p>Taking into account the risks, in some cases additional classes are organized for in-depth study of a topic, including inviting guest lecturers.</p>
<p>How do students feel at LLU (including during the restrictions caused by the Covid19 pandemic, in distance learning)?</p>	<p>When starting their studies, students have to get used to the requirements of independent work and higher education, which differ from the school environment. Consequently, many students note a slight fear and stress, whether they will be able to cope with the study process. However, students like the study environment and atmosphere, as well as the infrastructure and the availability and support of lecturers.</p> <p>A survey conducted during the Covid19 pandemic (04.2020) reveals that they spend more time acquiring knowledge than before, students have difficulty motivating themselves to study, and stress is caused by uncertainty about the end of the study year. However, a regular and uninterrupted study process is ensured through the LLU Moodle e-learning environment (<i>which students appreciate as a good opportunity</i>) and students are convinced that they will be able to complete all study courses on time and successfully.</p> <p>It should be noted that the acquisition of the practical part of the study programme remotely is difficult and cannot provide excellent results, as well as requires a much greater effort on the part of lecturers and students. Therefore, remote work should not be included as an independent approach after the situation has improved.</p>

Student surveys for each study course (centrally through LLU IS system)	<p>Students have the opportunity to evaluate each study course, where they evaluate the availability of the teaching staff, the ability to clearly present the information of the study course, the feedback provided, the methods used, as well as the clarity of the evaluation criteria. In general, the average rating of the Department of Landscape Architecture and Planning remains consistently high (in the range of 3.5-4.0). It should be noted that this survey is not completed by a large number of students, so it should be improved to obtain a more representative result.</p> <p>As the construction industry changes and develops, more and more challenges and necessary knowledge appear, which are integrated into the existing study courses, supplementing the study programme (<i>computer programmes, BIM, BIS, materials and technologies, landscape ecology and environmental protection, smart and flexible planning, public involvement in the planning process, photoremediation, etc.</i>).</p> <p>This information helps to improve each study course and is visible to each lecturer in their assessment of study courses.</p>
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Graduate and employer feedback

In the field of landscape architecture, employers are most often also graduates of LLU landscape architecture and planning study programmes. Thus, the overall assessment by both groups of respondents is analyzed. Information about those working in the field and their opinions is obtained by the LLU both from surveys and much broader and more specific discussions organized by the industry, where one of the topics is the quality of education (discussions are organized both during LAAA annual general meetings, in separate thematic groups and councils (*representative of the study programme*) and in updating the professional standards).

Question group / topic	Analysis (changes, trends)
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<p>Graduates have acquired the theoretical and practical knowledge necessary for work in the field and are able to apply it in the performance of work tasks</p>	<p>Respondents note extensive theoretical studies and some topics that would require more practical knowledge. It should be noted that the Latvian labour market in the area of landscape architecture is changing and more and more projects involve several specialists (as it is globally), which allows a landscape architect to act within their competences, rather than to deal with all aspects of the industry as a whole (<i>landscaping elements of design, lighting, horticulture, installation, building structures, etc.</i>).</p> <p>The results have been used to improve the balance of the overall theoretical and practical parts of the study programme.</p>
<p>Graduates are able to explain and discuss aspects of the relevant field of science</p>	<p>In general, graduates are able to explain aspects of the work, but many still need to learn to do so in a reasoned, convincing manner. For this purpose, time is allocated in the study process for the presentation of works and speech training in both Latvian and English. This information helps to improve graduates' ability to discuss industry topics by integrating discussions and presentations into each course, including project presentations to stakeholders.</p>
<p>In their work, the graduates are able to use and, if necessary, learn and use modern technologies and innovative solutions.</p>	<p>The majority of respondents are positive about this indicator, pointing out that in recent years, graduates' knowledge of technology has even surpassed that of the employer, thanks to a modern and powerful computer classroom and knowledgeable teachers. Acquisition of modern technologies in the study process is a priority, it is integrated into the study courses, acquiring the software used in the field starting from the 1st year.</p>
<p>The graduate is able to plan their time and resources for the performance of the assigned duties</p>	<p>Most respondents are positive about this indicator. During the studies, work on project development is related to self-discipline and the ability to organize one's work, which, when concluding studies, is also useful in practical work. Time management is one of the biggest challenges for students - in each study course, teachers prepare a time schedule that helps students to sequentially learn the subject and complete the assigned tasks while learning to plan their work.</p>

Ability to work in a team, performing the assigned work duties responsibly and in good quality	All respondents positively noted this indicator, facilitated by the number of study tasks that students must complete in groups. Team work in the study programme is improved in several study courses, allowing students to work in groups and jointly plan their time, as well as seek compromises and common views to solve problems.
Ability to competently express an opinion on professional issues, justifying it	Graduates are generally able to express their professional opinion on industry topics, but not everyone succeeds to do it convincingly, which is associated with the experience of the young professionals.
Motivation for self-growth and further education	Most respondents are positive about this indicator.
Ability to make decisions and find creative solutions in changing or uncertain circumstances	Decision-making is an important aspect of work, where some graduates cope well, but not all graduates are able to make decisions in uncertain situations, this could be explained by the instability of the industry itself in the labour market.
Ability to motivate their colleagues / subordinates for self-growth and professional development	Respondents note the poor motivation of other colleagues, which can be explained by the independence of the profession.
Demonstrates self-initiative in the performance of the assigned duties in order to achieve the best possible result	Most respondents are positive about this indicator, noting graduates' desire for better results.
Be communicative, responsive	Most respondents are positive about this indicator. However, it should be noted that such an assessment depends on the characteristics of the personality, as well as on the specifics of the work and the team.
Understands professional ethics, is able to evaluate the impact of their professional activities on the environment and society	Most respondents are positive about this indicator.

<p>What other knowledge and skills do you expect from LLU graduates?</p>	<p>Both the graduates themselves and the employers had noted the lack of knowledge of plants. Therefore, by making improvements to the study programme, the amount of CP in study courses has been increased, where it is planned to learn more about a range of plants. In the future, support is needed for the creation of model gardens near the building of Valdeka Manor, so that students can also acquire practical skills in gardening. It should be noted that all over the world, within the competence of a landscape architect, knowledge on plants is acquired on a more conceptual level (<i>knowing plant types, shapes and diversity, rather than planting and care technologies</i>), because teamwork and cooperation with gardeners is important. In Latvia, due to the poorly developed horticultural industries, the labor market is distorted, and the competences of a gardener are demanded from a landscape architect. In co-operation with the industry and the Bulduri Horticultural Secondary School under the supervision of the LLU, work is currently underway to strengthen the horticultural industry.</p>
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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 students of the study programme are active in ERASMUS mobility programmes (*Fig.3*), the exception is 2017, when the changes in the study programme took place and the students avoided going on exchange due to adaptation to the new study plans. Currently, when the study process has been smoothed out, students are happy to go on ERASMUS exchange at the Bachelor's level, specifically for studies, because the internship in the programme is not planned after the changes in the study programme that took place in 2017. Students going abroad on mobility programmes are provided with the opportunity to take the missed courses for another term after their return, as well as it is possible to acquire study courses remotely while abroad. Before going on a mobility programme, an individual Letter of Intent is drawn up with each student, which provides for the procedure of reconciliation of study courses when returning from mobility (LLU Rector's Regulation No. 4.3. – 8/78 (02.22.2016.) "*On Procedure of Academic Recognition at LLU*" is available in the Appendix 6) .

The most popular higher education institutions chosen by students for exchange are - *Wroclaw University of Environmental and Life Sciences, Corvinus University of Budapest, Neubrandenburg University of Applied Science, University of Algarve, Swedish University of Agricultural Sciences, Estonian University of Life Science, TEI of Kavala, Szent Istvan University, University of Porto*. The students' choice is based on the offer of the universities, which is equivalent to our study programme and easily comparable. In general, 70-90% of study courses acquired abroad are

equated to those in the current programme. The exception is the specific study courses offered by our study programme - architecture, Latvian plants, Latvian legislation, labor and civil protection. In recent years, due to the global instability and the pandemic, students are less likely to go on exchange.

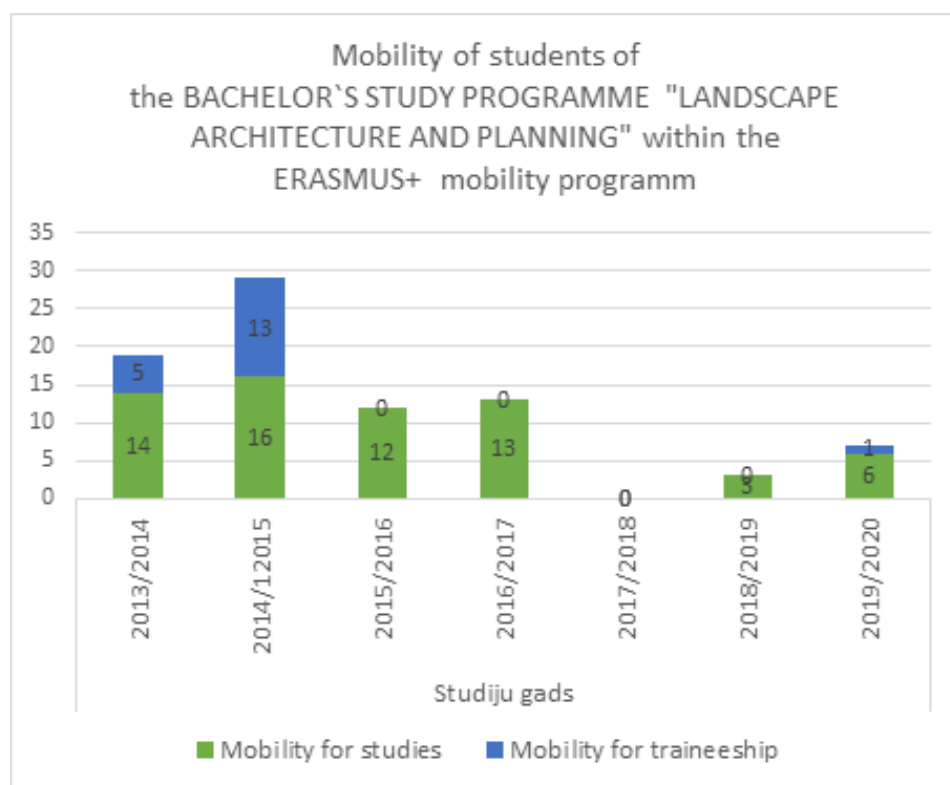


Figure 3 Number of students of the programme participated in ERASMUS+ mobility programme during the reporting period

The total number of incoming students within the Erasmus exchange program is 27 students from different countries - Portugal, Greece, Germany, Turkey, Poland, Spain, Slovakia, Iceland, Russia, Ukraine, Romania, etc. (Fig.4).

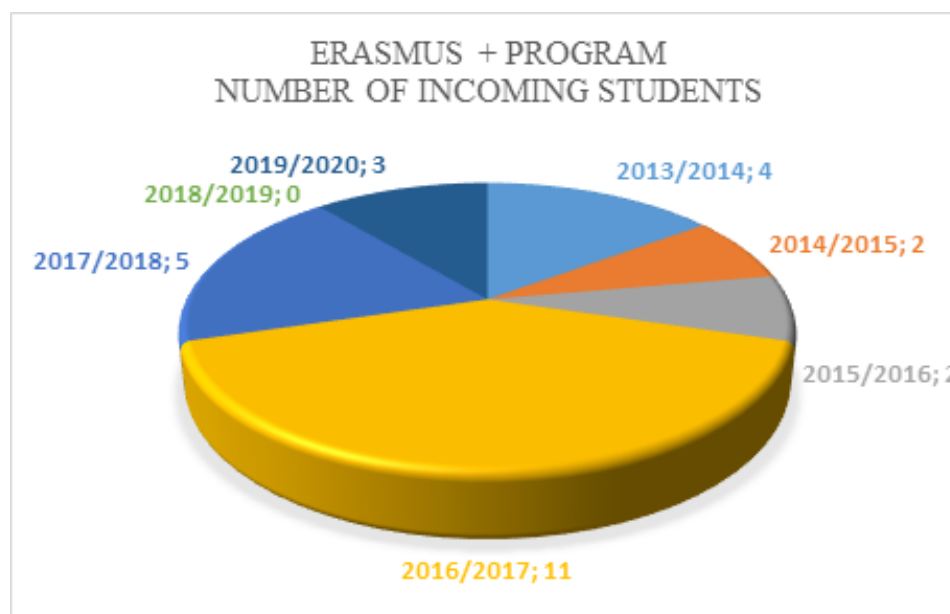


Figure 4 Number of incoming international students within the ERASMUS+ mobility program

In addition to the ERASMUS exchange, the study program participates in the **Bova - Nova network**, organizing study courses in cooperation with Lithuanian and Estonian universities.

- In 2014, BOVA study course “Landscape Studio”, where 5 students of LLU and 5 foreign students from Estonia and Finland participated.
- In 2015, within the framework of BOVA intensive Master's course “Landscape Ideology”, an international group of students - 21 students from the Estonian University of Life Sciences.
- In 2016 - BOVA course “Landscape Cognition”, a total of 15 students from Estonia, Lithuania and Latvia.
- In 2017 - BOVA international undergraduate study program “Landscape in Focus”, 32 students from four countries - Latvia, Lithuania, Denmark and the Czech Republic.
- 2018 - Developed international BOVA basic study course “Landscape Regeneration of Degraded Areas” in cooperation with Ludza municipality. 8 Lithuanian and 15 Latvian students participated in the course.

Students also have the opportunity to participate in **international summer schools** organized by the department. Funding was provided by the State Education Development Agency. The summer school is implemented in cooperation with the Lifelong Learning Center of the LLU:

- in 2013, the second international summer school of landscape architects “Local Landscape Via Ecology, Art and Mystic” was organized and successfully held, which was attended by 10 foreign students from different countries - China, Mexico, Spain, Estonia, Lithuania, Germany, Austria, Poland, Hungary, Czech Republic.
- In 2014, the summer school “Re-feeling the city landscape. Riga” was organized and participants included 7 students from Austria, China, Bulgaria, Germany and 2 students from Latvia <https://www.facebook.com/summerschoollatvia/videos/955857677763406>
- In 2015, the International Summer School “Daugava River. Visible. Invisible” was attended by 6 students from 4 countries and 2 LLU students.
- In 2016 - Within the framework of the International Summer School “W-Scape” (*In cooperation with the University of Finland, Jelgava and Riga municipalities (within the Interreg project)*) 9 students from Estonia, Finland, Slovakia, Azerbaijan, Uzbekistan, Sweden and 15 LLU students took part.

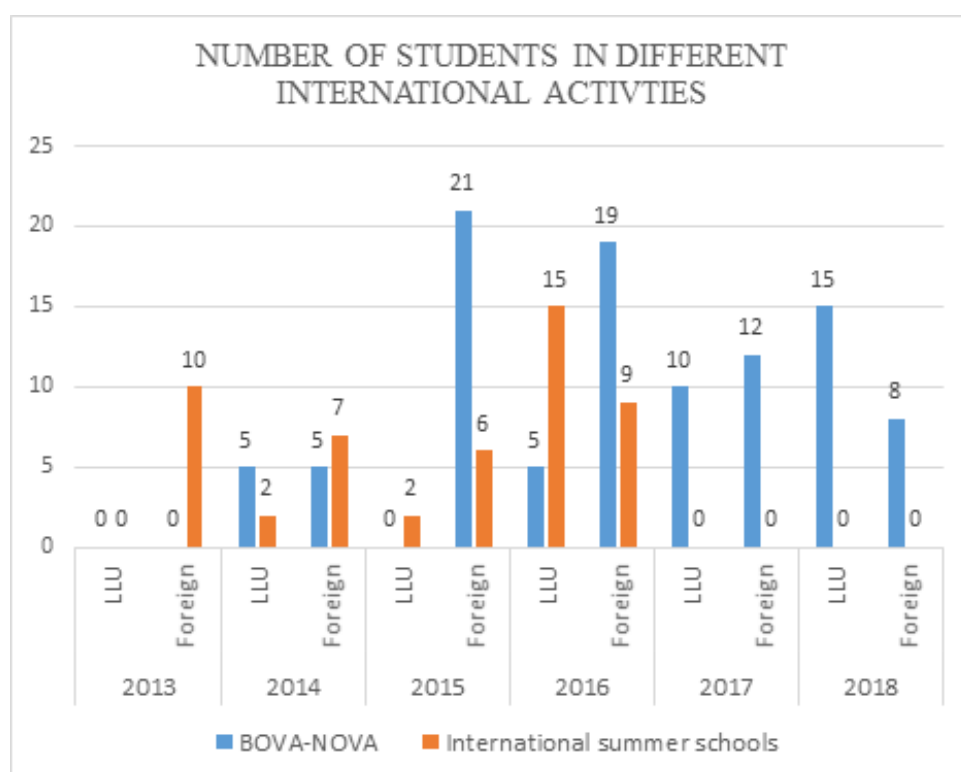


Figure 5 Number of LLU students and incoming international students participated in different international activities

A total of 151 students participated in international activities (*excluding ERASMUS*) in the reporting period, of which 97 were foreign students (*Fig.5*).

In addition to opportunities for various exchange programs, **cooperation has been established with St. Petersburg State Forest Technical University** (Russia) and exchanges take place every year. In the intensive study course, students learn the principles of planning cultural and historical gardens, visit historical gardens and parks in each country under the guidance of lecturers, excursions and planning *plein airs* are organized. Around 30 students visited each country in two years.

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 resources of the study program consist of three groups - equipment, software and literature. Literature on the following topics is available in libraries, information center and methodical cabinet - Landscape and nature; Ecology and environmental protection; History of architecture and garden art, cultural history; Landscape planning; Greenery; Outdoor building materials and elements; Construction and maintenance of facilities; Landscape management, economics, management; Environmental psychology, landscape sociology; Public involvement, marketing, communication; industry scientific journals. Students also have access to the LLU library remotely, as well as access to scientific databases using their student access passwords <https://ilufb.llu.lv/en>. Students also have access to the scientific journal "Landscape Architecture and Art" of the Department of Landscape Architecture and Planning, both in printed and digital form https://ilufb.llu.lv/Raksti/Landscape_Architecture_Art/, which also reflects the research of Latvian scientists in the field of landscape architecture and planning. **The relevance of the study program resources with the achievable results of the study programme** is reflected in *Appendix No.7*.

Example of equipment used: Students of the study course "*Residential Building Territory*":

- Acquire theoretical material in lectures and independently - by using computers, screens, databases and book repositories;
- Carry out cultural and historical research of the territory, analysis of the current situation - by using photo and video cameras, learn various research methods from books and magazines and search information on the historical development of the place;
- conduct research of the territory in nature - visual materials have been printed (plotter,

computer, software);

- develop functional zoning - digital sketching tools, computer, graphic computer software, plotter, scanner;
- develop the final project - digital sketching tools, computer, graphic computer software, plotter, scanner;
- develop a model for the project solution - laser cutter, plotter, scanner;
- defend the project - computers, graphic software, screens.

Provision of financing. The number of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for **Bachelor's programmes is 1** and the social funding of one study place for Bachelor's programmes is 164.34 EUR, the study cost **coefficient for the Bachelor's programme "Landscape Architecture and Planning" is 3.1** (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"), costs per student in the Bachelor's programme "Landscape Architecture and Planning" amount to 5217.66 EUR.

In 2021, the **tuition fee** in the study program is 1300 EUR per semester, or 2600 EUR per year for Latvian students and 4000 EUR per year for foreign students.

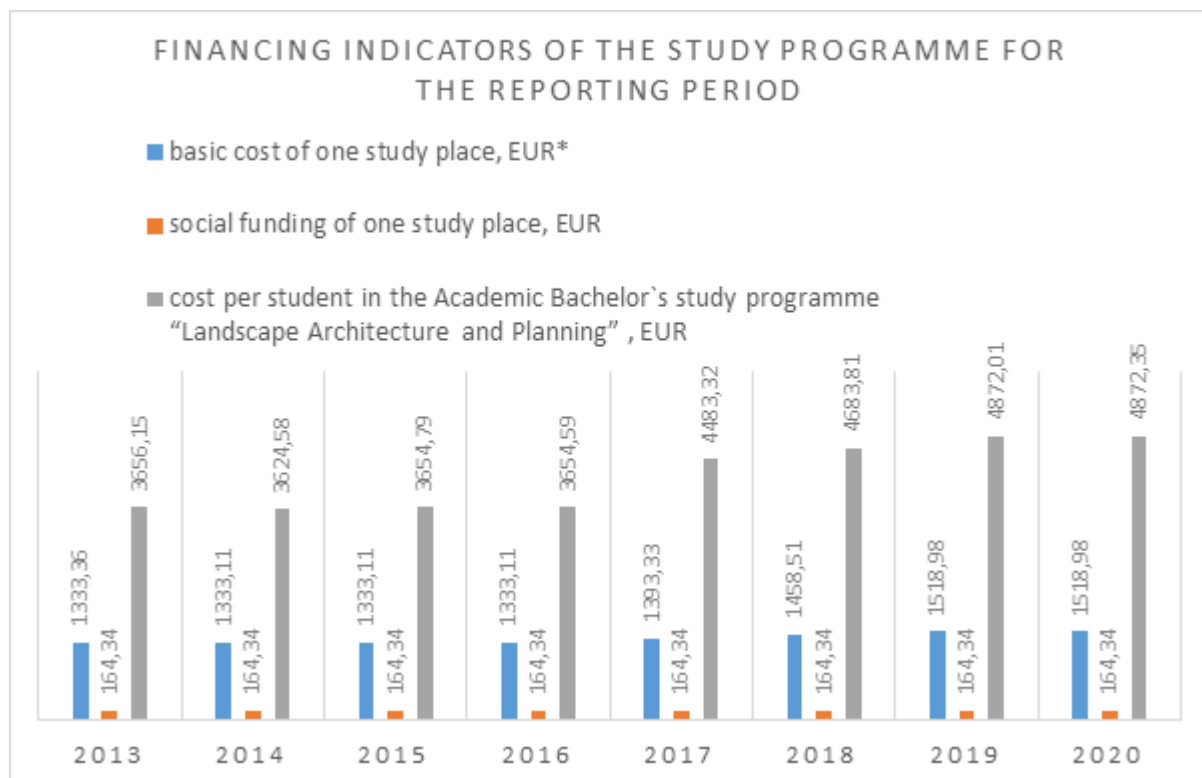


Figure 6 State funding per study place in the bachelor study programme "Landscape Architecture and Planning"

* Cost per student slightly differ at the same basic data (the basic cost of one study place and the social funding of one study place) in 2014, 2015 and 2016, and 2019 and 2020, because every year the provision of the study coefficient is provided in % with some decimals and may be slightly different. Rounding up, this provision is 100%, but, in figures in the contract in 2020 it was - 99.98242%, in 2019 - 99.97517%. Similar situation was in 2016, 2015 and 2014, when the provision was 85%, but in figures in the contract in 2016 - 84.45564%, in 2015 - 84.46058%, in 2014 - 83.7295803%

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the Bachelor's study program "Landscape Architecture and Planning" consisted of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Financial support has increased during the reporting period, but so have expenditures, the minimum wage rate and other economic indicators. Paid students do not cover the state-paid budget places, because tuition fees for similar study programmes in the field of education in Latvia are not yet close to the state funding, so it would not be competitive to determine it this way, but the paid places of the study programme includes only students with study debts, except for the first year, when there are more students enrolled than there are budget places available.

Additional financial support opportunities for students in the programme

State scholarships in the academic Bachelor's study programme until 1 January, 2020 were 99.60 EUR, but for the period from 01.01.2020 until 31.12.2021, the scholarships are intended to reach 200 EUR per month. In one study year, scholarships are awarded to an average of 13 students, according to the number of successful students, the scholarships are distributed in proportion to the students of each study year who have received the highest grades. Students in the programme also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU (Senate, Jāņa Čakstes, Kārļa Ulmaņa etc.), as well as special scholarships for the field (the scholarship of RTU Development Fund and SIA Itera Latvija has been awarded since 1998), the scholarship of A.Tramdahs of the Faculty of Environment and Civil Engineering. Such scholarships have been received by 20 students of the programme during the reporting period (*Fig.7*) .

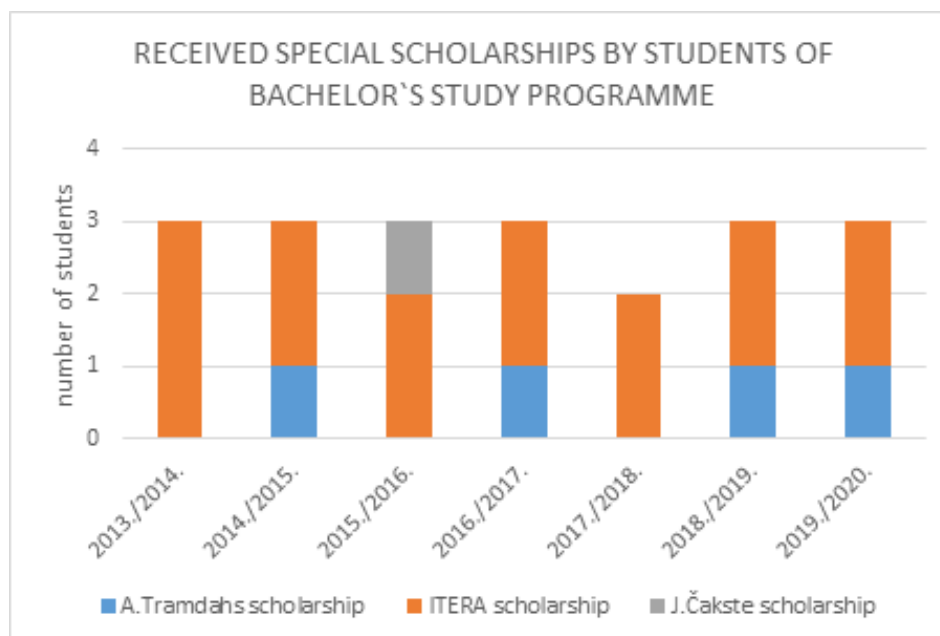


Figure 7 Number of students of the programme awarded by other scholarships during the reporting period

In general, it can be concluded that the study base, scientific base, information base, material and technical base and financial base comply with the specifics of the study programme, its implementation conditions, as well as student-cantered education principles and creates preconditions for achieving study results and indicates the possibility to ensure a high quality study process.

The department also ensures the provision of the study process **in cooperation with other structural units of LLU**:

- In cooperation with **the LLU Language Center** and other structural units of the LLU, a conference “Students on their way to science” was organized;
- Cooperation with the **Fundamental Library of the LLU** in work with library resources, including databases;
- Cooperation with the **Bibliographic Information Department of the LLU** in supporting students' work with databases and study literature and databases available at the LLU;
- Cooperation with LLU **Communications and Marketing Center** and **Study Center**, to create understanding about the use of e-studies and LLU IS in the study process, finding current information on LLU and faculty websites, social media;
- Cooperation with the **LLU Museum**, to form an understanding of the cultural and historical values managed by the LLU, the historical development of the LLU;
- Cooperation with the **Operation and Maintenance Administrative Department of the LLU** for the implementation of a safe study process for mastering labor safety and civil protection issues.

In ensuring the study process, there is also cooperation with **other universities** in several directions:

Organization of conferences, review of scientific publication of the conferences:

- Cooperation with **Riga Technical University (RTU), Faculty of Architecture and Urban Planning** teaching staff in reviewing scientific articles for the publications of the scientific journal “Landscape Architecture and Art”;
- Cooperation with **RISEBA, Faculty of Architecture and Design**, review of scientific

articles for the scientific journal ADAMarts (Architecture, Design and Audiovisual Media Arts, ISSN 2256-0890).

Research work

- Cooperation with **LLU Forest and Water Resources Scientific Laboratory, Forest Faculty** and **Faculty of Agriculture** in project implementation, development of scientific publications, research.

Thesis evaluation commissions

- cooperation with **RISEBA and RTU in the evaluation of final theses in the field of architecture.**

Participation in doctoral and professor councils

- cooperation with **RTU Faculty of Architecture and Urban Planning**. Representatives of both universities are members of the joint RTU and LLU Architecture Professors' Council, RTU Architecture Promotion Council and LLU Landscape Architecture Promotion Council.

Conducting lectures and seminars

- cooperation with **the University of Liepaja**, in the spring semester of 2018, reading and conducting the study course "Environmental Design / Landscape Architecture" in the professional Master's study programme "Ecotechnology".

Organizing student plein airs and other activities

- Organization of the annual Latvian School of Architecture plein air in cooperation with **RTU, Riga Building College (RCK)** and **RISEBA**, LLU.

In addition, there is cooperation with the graduates - conducting guest lectures, organizing excursions, and participating in "Open Door" events and marketing events, talking about current events in the field, study experience and their work responsibilities, the specifics of the profession.

In general, in order to ensure the study process, there is a continuous cooperation both with the structural units of the LLU and with other universities. Together, they help to strengthen the internal links of LLU, providing students with access to resources, support on various issues, and organizing various events. Cooperation with other universities helps students to get to know the future colleagues of the industry, to establish friendly connections and to become aware of the breadth of the industry, as well as the stakeholders, the practical and scientific issues.

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 changes in the composition of the teaching staff are mainly based on the increase in the number of lecturers, who are the teaching staff of the department and have obtained doctoral degrees during this period (Fig.8). At the moment, the department has three professors, one professor *Emeritus* and one associate professor, who ensure the transfer of research methods and results of the field to the study process.

During the accreditation period, several academic staff members with a doctoral degree were involved in the implementation of the study programme, thus promoting a closer connection between the study process and scientific achievements, the succession in the research and its reflection in the final theses of students and creating interest of students in further education in the Master's degree programme and the doctoral programme.

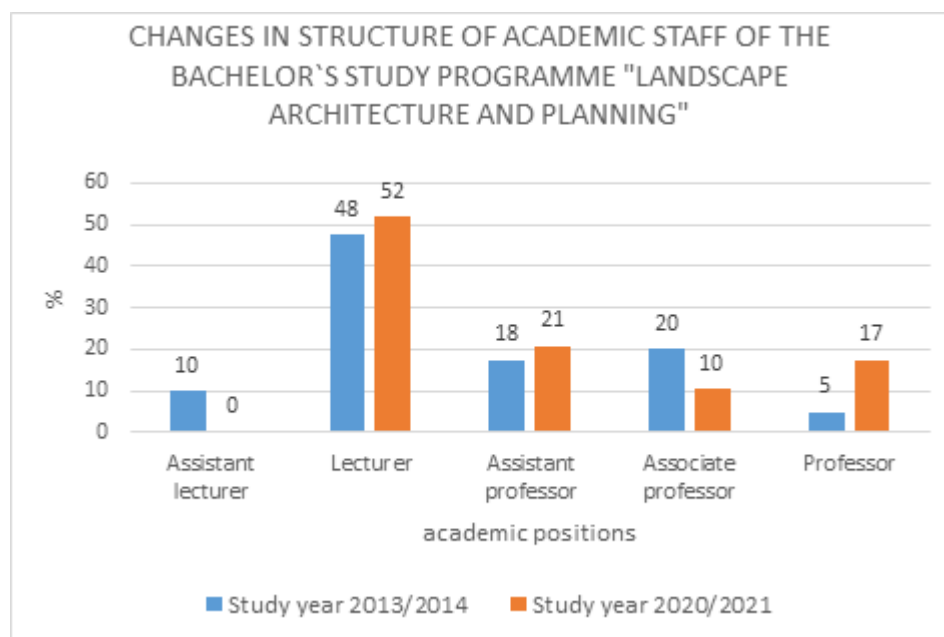


Figure 8 Changes in structure of academic staff of the programme during the reporting period

Attracting foreign guest lecturers is essential in the study process, creating an opportunity for students to get acquainted with other experience in landscape planning, as well as to improve their English language skills. Various financial instruments and opportunities have been used to attract foreign guest lecturers:

- Each study year, as far as possible, foreign guest lecturers are attracted from the **self-earned funds of the Faculty of Environment and Civil Engineering** (tuition fees). For example, since the 2016/2017 academic year, collaboration has been established with Professor Simon Bell of the Estonian University of Life Sciences and the University of Edinburgh (H-index in Scopus 20). Cooperation with Professor S.Bell is very important, because he has been involved in important projects, including the study of Latvian landscapes. The professor has been the President of the Council of European Schools of Landscape Architecture (ECLAS), thus strengthening the international recognition of the specialty of landscape architecture at the Latvia University of Agriculture and cooperation with foreign schools of landscape architecture.
- **NordPlus** and **ERASMUS** + programmes for attracting an average of 3-4 foreign guest lecturers from different countries each year
- **International summer schools** were organized 4 times with the financial support of the

State Education Development Agency and in cooperation with the Lifelong Learning Center of the Latvia University of Life Sciences and Technologies, attracting foreign guest lecturers for various activities, with the possibility also for students to participate in the activities;

- **BOVA** (The Baltic Forestry, Veterinary and Agricultural University Network) and **NOVA** (The Nordic Forestry, Veterinary and Agricultural University Network) programmes for attracting guest lectures from Lithuania, Estonia, Nordic countries and organizing intensive study courses <https://www.bova-university.org/about-bova-university-network>
- Different grants and funds, for example, several scholars and guest lecturers have been involved in **the Swiss grant** (Latvian-Swiss Cooperation Program Grant Scheme "Activities of Swiss Researchers in Latvia" <http://www.projekti.llu.lv/?ri=2206> (in Latvian))
- **LLU development projects** with the possibility to attract foreign guest lecturers (ESF project No. 8.2.3.0/18/A/009 «Improvement of Latvia University of Agriculture management») <https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2018/latvijas-lauksaimniecibas-universitate-s-parvaldibas-pilnveide> (in Latvian))

During the reporting period foreign guest lecturers were attracted from Norway, Sweden, Finland, Poland, Turkey, Germany, Slovakia, Spain, Portugal, Estonia, Lithuania, England, Iceland, Russia. Guest lectures are also given by foreign lecturers, who are cooperation partners of the study program and visit Latvia from Belgium, Scotland, Lithuania and Estonia.

The involvement of **guest lecturers - practitioners from the field of landscape architecture and planning** in the study process is also important, giving students an insight into the latest trends in the field. On average, about 10 guest lecturers from the industry are attracted every year.

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.

A total of 29 lecturers participate in the implementation of the study programme, 14 of them with a PhD and 15 lecturers with a Master's degree (Fig.9).

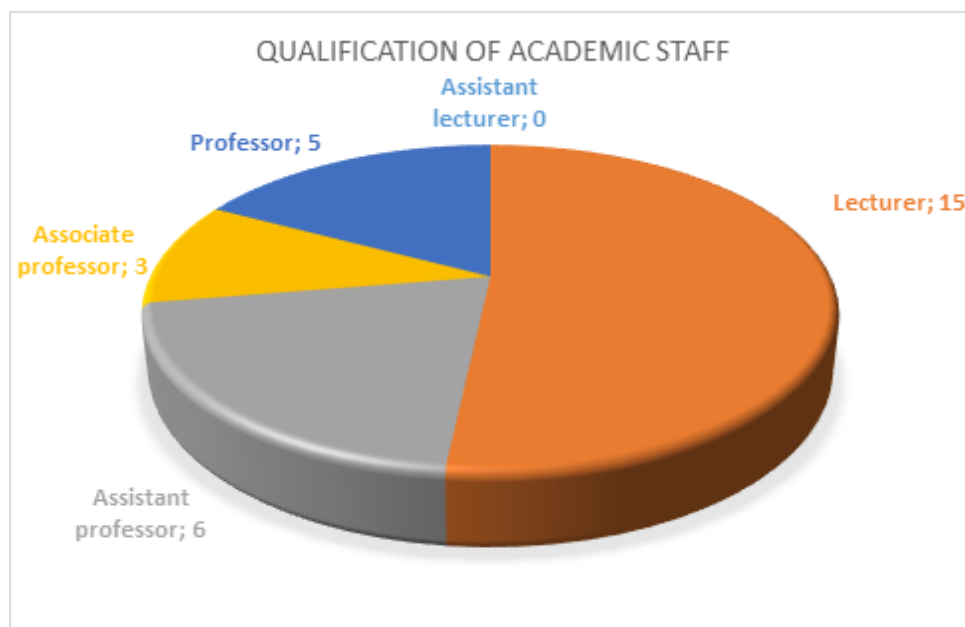


Figure 9 Qualification of academic staff

The study programme complies with the following implementation conditions and requirements of regulatory enactments:

Requirements	Compliance
The qualification of the academic staff involved in the implementation of the study programme complies with the requirements of the Law on Higher Education Institutions regarding the implementation of study programmes in a university-type higher education institutions. The provision set forth in Section 39 of the Law on Higher Education Institutions - <i>"Lecturers and assistants who do not have a scientific and academic degree need a five-year practical work experience corresponding to the subject to be taught."</i>	has been ensured
The knowledge of the state language of the teaching staff involved in the implementation of the study programme complies with the regulations regarding the scope of knowledge of the state language and the procedure for testing the state language proficiency for the performance of professional and official duties.	has been ensured
The English language skills of the teaching staff involved in the implementation of study programmes taught in English correspond to at least Level B2 (<i>Section 55 of the Law on Higher Education Institutions</i>).	has been ensured
In total, not less than five professors and associate professors , who have been elected to academic positions in the respective higher education institution shall participate in the implementation of the compulsory part and the limited elective part of the academic study programmes, except for the cases provided for in Paragraph two of this Section (<i>Section 55 of the Law on Higher Education Institutions</i>).	3 professors and 5 associate professors are participating

Each member of the academic staff has **published articles in peer-reviewed publications**, including international publications, in the last six years (in case of a shorter period worked, the number of publications is proportional to the time worked) or **creative artistic achievements** (such as exhibitions, films, theater performances and concerts), or **five years of practical work** (except length of service in the implementation of the study programme) in accordance with the Law on Higher Education Institutions

has been ensured

In order to increase their qualification, improve their English language skills, make new contacts for scientific and study process, as well as improve the study programme, the teaching staff goes to read **lectures and exchange experiences within the ERASMUS+ programme** (Fig.10). Every year at least 4-6 people from the teaching staff of the department go on exchange programmes. In 2019/2020, mobility and exchanges were not possible due to the pandemic.

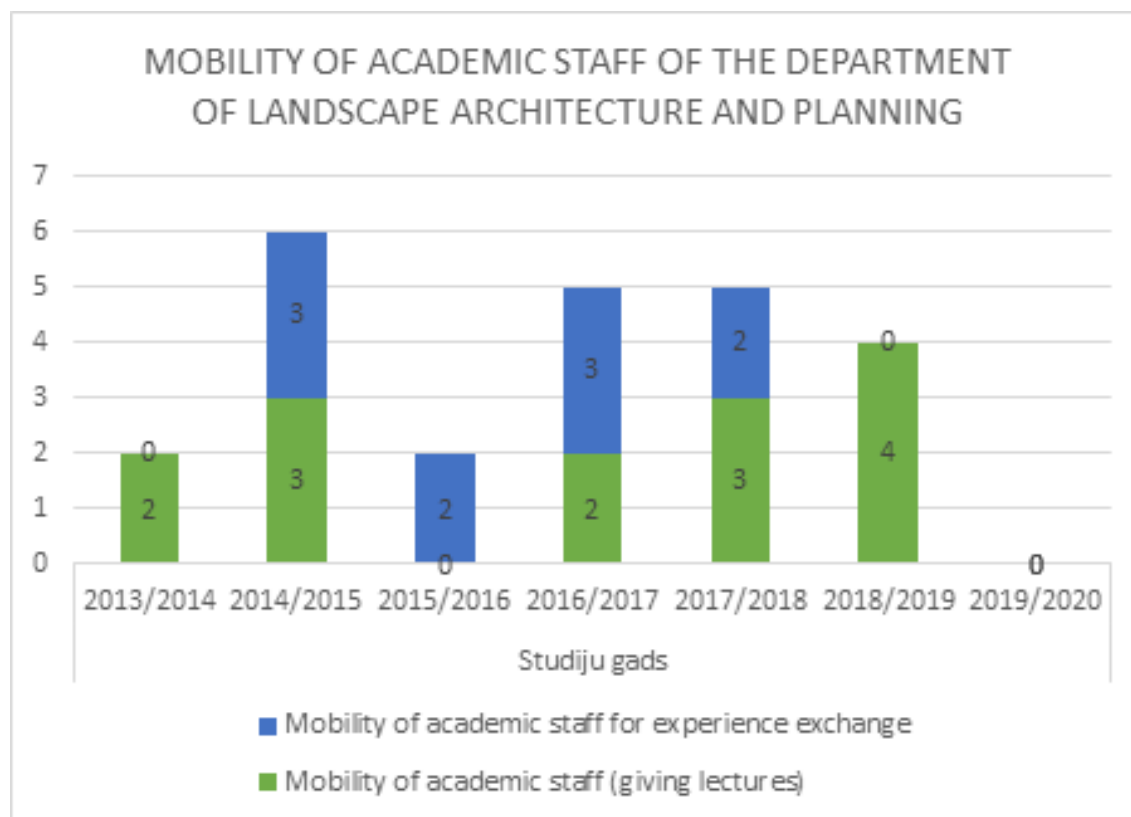


Figure 10. International mobility of academic staff of the programme within the ERASMUS+ program

The teaching staff participated in the following **activities that raised their academic and professional qualifications**:

- Industry professional development courses organized by the industry, ministries, within the framework of separate projects - seminars, courses, discussions, trainings, which cover a wide range of industry topics (regularly);
- English language courses organized by the LLU (regularly);
- University didactics courses attended by all elected lecturers (regularly);
- On LLU e-platforms - Moodle environment training courses for lecturers (regularly);
- ArcGIS specialized course, advanced training (2020);
- Academic Writing for Landscape Architects. BOVA, LLU (2017).

Faculty members are also invited to **participate in projects implemented by ministries or**

other institutions as experts, and **give lectures** to the industry - at least 10-15 different lectures each year. In addition, the teaching staff of the department has been implementing the lifelong learning program "*Garden and Landscape Architecture*" or more than 10 years in cooperation with the **Lifelong Learning Center of the LLU**, which is the most demanded course at the LLU and is attended by more than 50 participants each year.

The qualification and contribution of the teaching staff is also noticed by the industry, the state and local governments, presenting the teachers with **awards, letters of commendation and gratitude**. Latvian and international awards and recognitions received during the reporting period:

- Latvian Academy of Sciences, SIA ITERA LATVIJA and RTU Development Fund - seven awards received;
- Letters of Commendation from the Ministry of Agriculture of the Republic of Latvia - 2 Letters of Commendation received;
- European Academy of Sciences and Arts and Latvian Academy of Sciences Award for Young Scientists (Felix Award);
- Award of the European Council of Landscape Architecture Schools ECLAS;
- Award for the competition "Woman in Architecture and Construction";
- "Zemgales Laiks Ziedonis" for contribution to the development of Zemgale region - three awards received;
- LLU letters of thanks and recognition - at least 5 letters of recognition;
- Recognition of LLU textbooks and study materials;
- Awards of various competition commissions related to plein airs - at least 10 awards;
- Letter of commendation "Volunteer of the Year" for volunteer work in the activities of the Big Cleanup.

International industry organizations and networks where the teaching staff of the department participate:

- IFLA - International Federation for Landscape Architecture
- ECLAS – European Council of Landscape Architecture Schools Lecturer Kristīne Vugule was the secretary of the ECLAS organizing committee from 2009-2015.
- ELASA - European Landscape Architecture Schools Association
- EBANELAS - Eastern Baltic Network of Landscape Architecture Schools
- NORDNATUR network
- Nordic Landscape Research network
- Herity network (International Cultural Heritage Quality Management Assessment)
- NJF - Nordic Association of Agricultural Scientists

In Latvia, the teaching staff work in the following **Latvian- level commissions** :

- Competition "Best Building of the Year" expert commission (regularly)
- Zemgale Regional Student Research Conference - Commission of Expert Evaluation of Competition Papers (every year)
- LAAA Landscape Architecture Industry Certification Commission (regularly)
- Latvian School of Architecture Plein Air Steering Committee (every year)
- ITERA Latvia Scholarship Commission (every year)
- Jelgava City Agency "Culture" Jury Commission at the Sand Sculpture and Ice Sculpture Festivals (every year)
- RTU Faculty of Architecture Geniator XIV

In the reference period the changes in the academic staff were related to recruitment of younger colleagues who are professionals of the industry and who are able to deliver information to students

in a good quality on latest developments in the industry and who provide a close connection with modern landscape architecture environment in Latvia and Europe.

New teaching methods and latest information in the industry were acquired by academic staff members at the international level by participating in international mobility projects or international organizations thus improving the quality of studies with the latest discoveries, IT solutions and updating the necessary provision of the study environment.

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 teaching staff of the Department of Landscape Architecture and Planning has worked on scientific and popular-scientific publications, strengthening the link between research and the study process, as well as the transfer of research results in the field. A total of 231 **publications** were prepared during the reporting period (*Table 5 and Fig.11*).

Table 5

Publications elaborated by the academic staff of the Department of Landscape Architecture and Planning

Type of publication	Number of publications
International, peer-reviewed scientific publications included in Web of Science or Scopus scientific literature data bases	31

Scientific papers in anonymously-reviewed international scientific publications, incl. proceedings	63
Popular science and methodological publications	35
Abstracts of international conferences, other articles, publications, doctoral theses	102
Total:	231

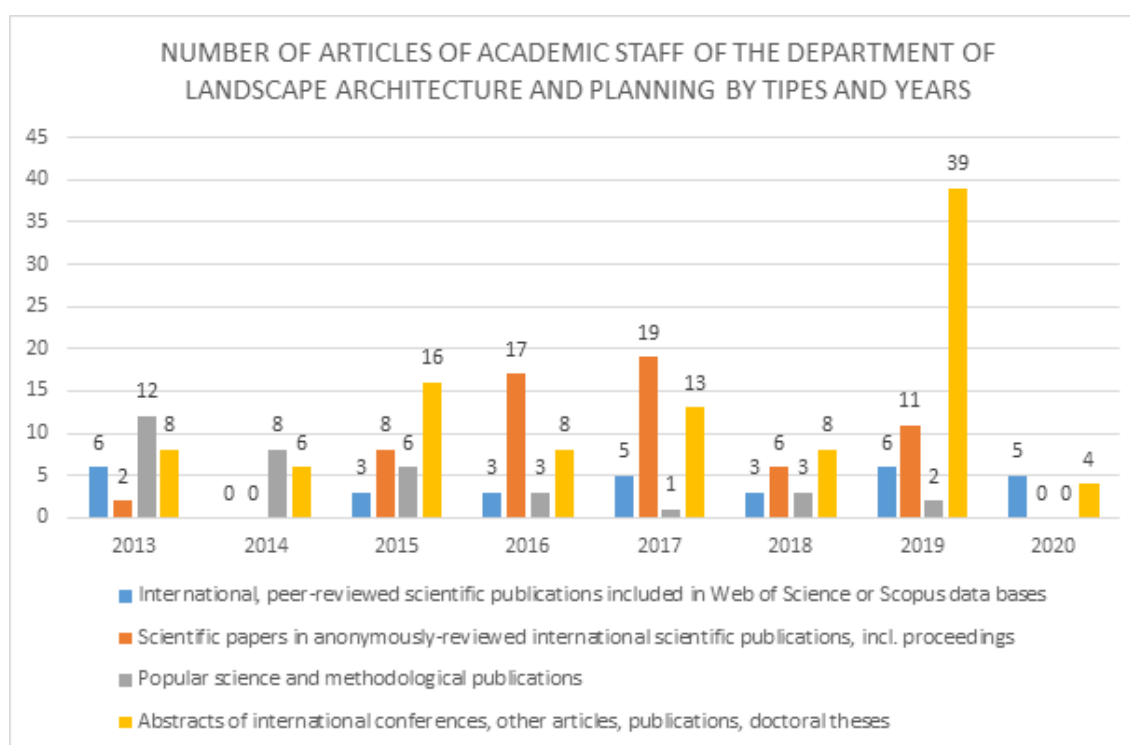


Figure 11. Publications of the academic staff by type and year

The teaching staff and doctoral students of the Department of Landscape Architecture and Planning have been involved in several projects that facilitated the strengthening of scientific capacity and the availability of resources necessary for the implementation of studies and science, the improvement of study programmes, research and the involvement of students in research (Table 6).

Table 6

The involvement of academic staff of the Department of Landscape Architecture and Planning in projects, linkage of the results of the projects to study process

Implemented projects	Linking the results of the programme and the application of information in the study process
Latvian national procurements	

<p>Research project of the State Research Program "Sustainable Spatial Development and Rational Use of Land Resources" (No. VPP-VARAM-ITAZRI-2020 / 1-0002) "Sustainable land resource and landscape management: challenges, development scenarios and proposals" (LandLat4Pol). Project implementation: 01.12.2020 - 30.11.2022 https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2020/ilgtspejiga-zemes-resursu-un-ainavu-parvaldiba-izaicinajumu (in Latvian)</p>	<p>The acquired knowledge and results will serve as a basis for recommendations to policy makers in regard to land use and landscape policy, strategic and spatial planning, the common agricultural policy and environmental protection. Examples of good practice will be prepared for industry professionals and researchers in the project scope. The study will provide new knowledge and solutions needed to develop a balanced use of land resources and sustainable landscape management in Latvia. For the first time in Latvia, comprehensive alternative scenarios and dynamic models for land resource efficiency will be developed, as well as a basis for an interactive landscape atlas.</p> <p>Within the framework of the project, it is planned to involve students, both Master's and Doctoral students. The results obtained during the research will supplement the content of the study programme, as well as increase the qualification and experience of the teaching staff.</p> <p>In addition, in the scope of the project it is intended to create a Master's specialization "Landscape Management".</p>
<p>Implemented international projects</p>	
<p>Interreg Latvia-Lithuania Programme "Sustainable Integration of Novel Solutions into Cultural Heritage Sites/ NovelForHeritage" http://www.vbf.llu.lv/lv/jaunu-ilgtspejigu-risinajumu-integracija-kulturas-mantojuma-sustainable-integration-of-novel (in Latvian)</p>	<p>Within the framework of the project, the attractiveness of Eleja manor park and Žagare manor park for tourists will be increased. Both parks have been designed by landscape architect and gardener G.Kūfals, who, at the turn of the 19th-20th centuries, was known throughout Europe. The involvement of the Latvia University of Life Sciences and Technologies and the Lithuanian Natural Heritage Foundation in the project will provide a scientific and practical approach that will be of interest to landscape architects.</p> <p>The teaching staff conducts research on the cultural and historical landscape, in cooperation with Lithuanian colleagues, the obtained materials will supplement the scope and content of the study programme.</p> <p>In the project, students participate in the plein air with the aim to create ideas for the development of the planned exhibition hall in Eleja, as well as participated in educational seminars and, additionally, created environmental objects in Eleja park.</p>
<p>Interreg Baltic Sea Region project "Water driven rural development in the Baltic Sea Region" (WATERDRIVE) https://water-drive.eu/about/ https://www.llu.lv/lv/WATERDRIVE (in Latvian)</p>	<p>Within the framework of the project, it is possible to share experience, access information, promote public involvement in various approaches to address and inform, as well as introduce new and smart management measures on agricultural land. Spatial planning to control the risks of climate change - droughts and floods in downstream agricultural areas - a new risk mitigation system. Within the framework of the project, the task in this activity is to use the assessment of ecosystem services for the assessment of river basin territories, involving the population, as a case study method.</p> <p>In this project, there is cooperation between several departments and scientists both within LLU and at the international level.</p>
<p>Interreg Latvia-Lithuania Programme 2014-2020 project „Creation of Joint GI Education to Increase Job Opportunities in the Region" (No. LLI-206). Project implementation period: 2017-2020. http://gisedu.eu/en</p>	<p>Within the framework of the programme, a training course on the use of ArcGIS software for landscape research, planning and management is planned, which is acquired by lecturers as they improve their qualifications, with the aim of integrating the use of ArGIS into separate study courses in both Bachelor's and Master's degree programmes.</p>

<p>Interreg Latvia-Lithuania Programme 2014–2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions” (BrownReg). Project experts from VBF Departments of Land Management and Geodesy, Environment and Water Management, Landscape Architecture and Planning, Forest Faculty and Faculty of Agriculture. Implementation period 1.03.2018 - 31.08.2019 Project leading partner - LLU, partners - Ludza municipality (LV), Ignalina and Kupiškis municipalities (LT).</p> <p>http://www.vbf.llu.lv/lv/innovative-brownfield-regeneration-for-sustainable-development-of-cross-border-regions-brownreg (in Latvian)</p>	<p>The main activities of the project will include: gathering, implementing and popularizing new knowledge for innovative revitalization of degraded territories, in cooperation with the university and municipalities developing a good practice guide for municipal spatial planners, industry professionals and the public; 3D modeling, site remediation and installation and monitoring of phytoremediation pilot sites for remediation of contaminated soils in degraded areas in Ludza, Ignalina and Kupiškis; public involvement in cleaning up the territories. Based on the promotion of cooperation between scientists and municipalities, the project results will provide an important practical, scientific and informative basis for innovative, environmentally friendly brownfield revitalization approaches that can be used for future projects of revitalization of degraded areas and in the study process. Students were also involved in the project - participating in the Bova course “Degraded Territories”, as well as actively participating in the practical part of the project implementation, as well as participating in the educational events. The handbook developed in the course of the project has been used in the study process. In this project, there was cooperation between several departments and scientists, students.</p>
<p>Latvian-Russian Cross-border Cooperation Program 2014-2020 project “Sustainable Use of Water Resources for Tourism Development in Latvian-Russian Border Towns - Rzekne and Ostrov” (LV-RU-017) Urban Sticky Areas. Project implementation period: 2019-2021. Students participate in project activities</p> <p>http://www.vbf.llu.lv/lv/udens-resursu-ilgtspejiga-izmantosana-turisma-attistibai-latvijas-krievijas-robezpilsetas-rezekne (in Latvian)</p>	<p>During the project, local tourism actors will receive training in marketing, cooperation (clustering), tourism relations with sustainable management and natural resources. The project partners will develop research on water basins in Rēzekne and Ostrov, create materials for sustainable waterfront tourism routes. An integrated handbook on natural resource management and a common cross-border approach to the integrated natural resources management study process will be developed. Improvements will be made on the banks of two reservoirs, which will have a positive impact on the increase in the number of visitors to the improved natural objects of the Programme area. Bachelor's and Master's students participate in the project in several study courses - “Landscape Sociology” - researching the project territory, study course “Landscape in Focus”, developing interactive routes of Rēzekne River - Ecoquest <i>(in cooperation with LLU IT faculty students)</i>. In this project, there was cooperation between several departments and scientists, students.</p>

<p>In connection with the Latvian Association of Landscape Architecture (LAAB), the following project is being implemented: Leonardo da Vinci exchange program for the independent professional development of landscape architects in the Baltic Sea region CPD-LA (No. LLP-LdV-TOI-2013-LT-0138-P2). Project period: 01.09.2013 - 01.09.2015 Partners involved: Vilnius Gediminas Technical University (Lithuania, VGTU), Lithuanian Association of Landscape Architects (Lithuania, LALA), Latvian Association of Landscape Architects (Latvia, LAAB), German Federation of Landscape Architects (Germany, BDLA).</p>	<p>The project is based on 4 partners who transfer an innovative vocational education and training program (VET) with continuous professional development (CPD) working in the field of landscape architecture. The project donor country - BDLA (Germany) provides information, training and exercises on quality assessment methods in landscape architecture to other partners through the Continuing Professional Development System (CPD). Recipients of information and training: Lithuanian Association of Landscape Architects (Lithuania, LALA), Latvian Association of Landscape Architects (Latvia, LAAB), as well as Vilnius Gediminas Technical University (Lithuania, VGTU), which envisages adaptation of project management and methodological materials. In the project, LLU cooperates with the industry, Lithuanian colleagues and German colleagues, strengthening cooperation, as well as developing various industry training materials, organizing seminars, field trips and discussions. A separate training course has also been developed, its materials are integrated into the study process.</p>
<p>Eastern Baltic Network of Landscape Architecture Schools - a network of landscape architecture schools in the Baltic and Eastern European countries, which aims to compare study programmes between Latvian, Lithuanian, Estonian, Swedish, Norwegian universities and adapt them to the EFLA (European Federation of Landscape Architects) educational standard or landscape architecture. https://www.facebook.com/pg/Ebanelas-205603633183585/about/</p>	<p>In co-operation with the Baltic and Scandinavian countries, the directors of the study programme worked on the improvement of the study programmes in accordance with the educational standard developed by the European Council of Landscape Architecture Schools. https://www.eclas.org/eclas-education-guide/ As a result of the project, changes in the study programme were prepared and analyzed, which were later also implemented.</p>
<p>Project of the European Economic Area Financial Instrument Program "National Climate Policy" "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" (agreement No.2 / EEZLV02 / 14 / GS / 062/002). http://www.eklimats.lv/index.php/lv/ (in Latvian)</p>	<p>Thanks to the State Regional Development Agency Decision on the European Economic Area Financial Mechanism 2009 - 2014, the program "National Climate Policy" small grant scheme project "Increasing the Capacity of Electronic Materials on Climate Change in Rural Areas" was approved and the LLU Faculty of Environmental and Civil Engineering worked on the modernization of several study courses and their development in the form of e-studies. The overall aim of the project is to improve the availability of information on the effects of climate change and mitigation tools in rural areas. The overall direct goal is to develop high-quality electronic learning modules on climate change and mitigation tools in rural areas, thus improving the transfer of information from research to the study process. In this project, there was cooperation between several departments and scientists, students.</p>
<p>Implemented contracts in cooperation with local governments</p>	
<p>A thematic plan "Concept of Daugava river landscape in Aizkraukle" has been developed. Commissioning party - Aizkraukle Municipality Council.</p>	<p>Both lecturers and students are involved in the implementation of the project, working on the research of the territory, as well as the development of the development concept and gaining practical experience. The methods developed in the project are integrated in the study process.</p>
<p>A concept for the development of greenery and facilities for the territory has been developed for the Pauls Stradiņš' Clinical University Hospital. Commissioning authority - VSIA "Paula Stradiņa Klīniskā universitātes slimnīca";</p>	<p>The teaching staff carried out research work, obtaining additional materials for the implementation of study courses. Later, this area was also developed as a Bachelor's thesis. The methods developed in the project are integrated in the study process.</p>

<p>The thematic plan “Landscape concept for Ikšķile city and villages” has been developed. Commissioning party - Ikšķile Municipality Council.</p>	<p>The teaching staff carried out research work, obtaining additional materials for the implementation of study courses. Within the framework of the project, students developed improvement projects for one of the territories. The methods developed in the project are integrated in the study process.</p>
<p>LLU programme projects</p>	
<p>“Improvement of LLU academic staff” https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2019/llu-akademiska-personala-pilnveidosana (in Latvian)</p>	<p>During the project, in each of the study directions, the following has been implemented: internship of the academic staff with entrepreneurs in order to promote closer connection of the study process with the national economy and to increase the competence of the teaching staff; increased level of English language skills of the academic staff in order to promote the development of new study programmes, attract foreign students and increase professional performance; improved leadership and communication skills of the academic staff in order to ensure more efficient and modern study process, efficiency and quality of work performance; doctoral students are engaged to study direction in order to promote the implementation of human resources renewal and succession plans; foreign academic staff has been engaged to the study fields in order to more effectively ensure the achievement of the basic goals of the LLU and to approach its vision faster - to become one of the leading universities of science and technology in the Baltic Sea region.</p>
<p>“Strengthening the research and development infrastructure and institutional capacity of the LLU and the scientific institutions under its supervision.” https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2017/llu-un-tas-parraudziba-esoso-zinatnisko-instituciju (in Latvian)</p>	<p>The aim of the project is to increase the scientific research and innovation capacity of LLU and the ability to attract external funding by investing in human resources and infrastructure.</p>
<p>Modernization of LLU STEM study programmes https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2017/llu-stem-studiju-programmu-modernizacija (in Latvian)</p>	<p>During the project, the premises, auditoriums, computer classrooms and laboratories necessary for the implementation of STEM study programs will be repaired, equipped and modernized. The infrastructure of the Fundamental Library of the LLU has been improved and modernized. In order to improve the knowledge of students and lecturers and to achieve the results of the study programmes, the range of available literature with printed and e-books will be expanded. Modernization of the unified management LLU Wi-Fi network will be performed, including software renewal, expansion of Blade type server park with server software to ensure study process, expansion of disk array capacity for information storage and circulation, LLU network equipment, network functionality expansion, purchase of antivirus software, extension of firewall software functionality, emergency generator power supply solution for data center.</p>

<p>ESF project No. 8.2.3.0/18/A/009</p> <p>“Improvement of the Management of Latvia University of Life Sciences and Technologies”</p> <p>https://www.llu.lv/lv/projekti/apstiprinatie-projekti/2018/latvijas-lauksaimniecibas-universitates-parvaldibas-pilnveide (in Latvian)</p>	<p>The aim of the project is to improve the quality of the content of LLU study programmes and, using the available resources effectively, to ensure better management of the higher education institution and increase of competencies and skills of the management staff.</p> <p>Within the framework of the project, the content of the existing study programmes was improved and adjusted to the needs of the development of the field; evaluation and improvement of the functions of the organizational and management structures of the university; improvement of the university quality management system; development, improvement and implementation of e-solutions for management and internationalization needs; improvement of knowledge, skills and competencies of university management staff; international peer-review and updating of the change plan.</p>
<p>LLU programme “Strengthening of scientific capacity at LLU” project “Road landscape modeling”, agreement No. 3.2.-10/50.</p>	<p>The aim of the programme is to promote the development of the priority research directions defined in the LLU science development strategy and the development of appropriate doctoral theses.</p>
<p>LLU program “Strengthening the scientific capacity of LLU” project “Industrial heritage landscape on the Western coast of the Baltic Sea in Latvia”, agreement No. 3.2.-8/58.</p>	<p>Within the framework of the programme, two doctoral researches are supported, which are important for the development of science and connection with the study process.</p>

In addition, 4 lecturers of the Department of Landscape Architecture and Planning have acquired and regularly maintain the rights of LZP (*Latvian Council of Sciences*) experts, and a joint Council of Professors of Architecture at RTU and LLU has been established.

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).

Various principles of cooperation have been observed in the acquisition of the study programme:

- The **principle of succession** of separate study courses - knowledge, skills and competencies are acquired gradually, thus the study courses are connected sequentially - the acquisition of separate parts is possible only after the acquisition of the previous subject. The principle of succession of study courses has been developed and observed in cooperation with the lecturers;
- **Project-oriented training** - implemented through the implementation of an extensive study course each semester, in cooperation with the lecturers of related study courses. This principle helps to acquire theoretical courses with practical implementation, as well as orients students to specific industry topics. Extensive / central study courses - Natural Landscape, Single-Family Houses Territory, Parks and Squares, Public Building Territories, Residential Building Territory, as well as the Bachelor's Thesis (*marked in green in the scheme in Figure 12*) form a series of related study courses. For example, in the 1st year students acquire the study course “Natural Territories” - the principles of research, planning and management are

associated with knowledge of landscape ecology, as well as they get acquainted with the concept of landscape and Latvian natural territories in the study course "Landscape Studies", where they learn to develop a project, as well as to use separate digital software in the study course "Digital Tools" to develop visualizations and to design tablets, as well as outdoor elements in the study course "Material Studies of Outdoor Spaces", which is adapted to their project - so during the semester they have mastered all aspects of natural territory planning. The acquisition of the entire study programme is built similarly. In order to implement this training method, there is a close cooperation of lecturers in planning, managing and evaluating the study courses.

- **Management and evaluation of large-scale course projects and exams** takes place in cooperation with several lecturers, because the implementation of large-scale study courses involves at least 2-3 lecturers, which helps to cover all the necessary knowledge and to evaluate students' works as objectively as possible. There is a continuous and close cooperation of lecturers in such study courses.

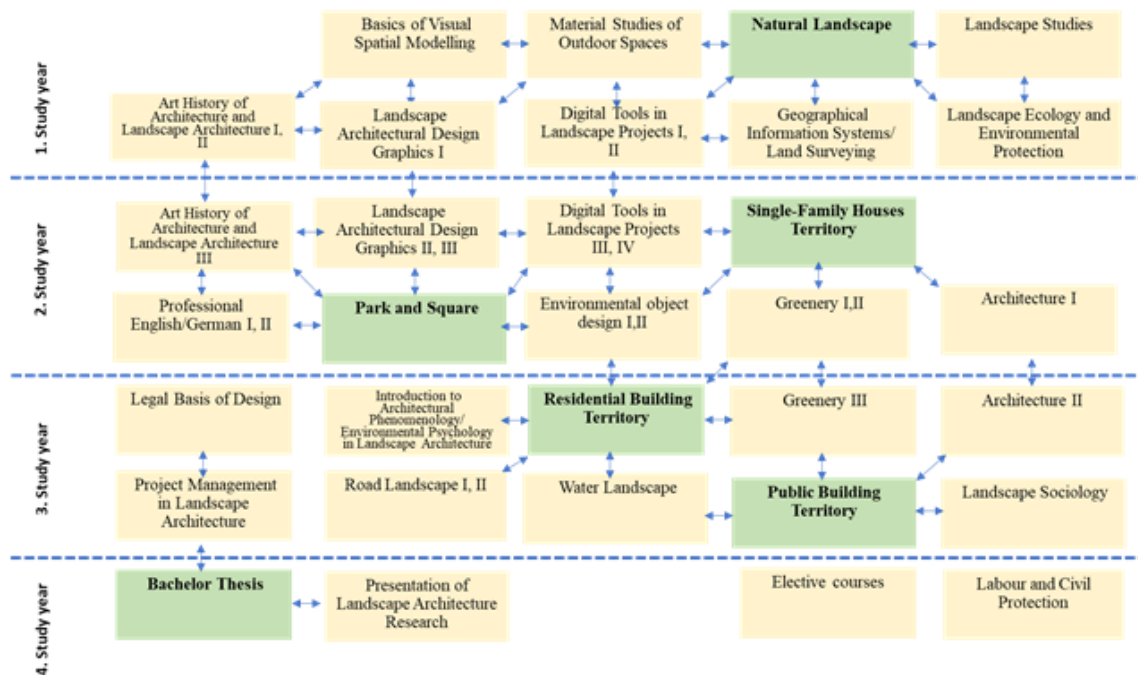


Figure 12 Cooperation principles between the main and supportive study courses of the programme

The majority (69%) of the academic staff is elected staff, which ensures staff stability. 37 people are involved in the implementation of the study programme, who realize 6.06 full-time positions. A total of 91 students are studying in the study program on 01.01.2020, thus **the number of students and staffing ratio** is 15, which is higher than the LLU average (13.2). It must be concluded that some lecturers teach only specific study courses for which they specialize, therefore they do not have a large workload or they teach this course in several study programmes. A total of 5,678.43 study working hours are provided for the implementation of the study programme. Most of the study programmes are implemented by lecturers with a doctoral degree (*professors, associate professors and assistant professors*).

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	2_appendix_statistic_data_students_ENG.pdf	2_piel_statistikas_dati_studejosie_LV.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	1_appendix_compliance_to_education_standard_ENG.pdf	1_piel_studiju_satura_atbilstiba_izg_standartam_LV.pdf
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	4_appendix_AAP_BAK_course_mapping_ENG.pdf	4_piel_AAP_BAK_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	3_appendix_study_plans_ENG.rar	3_pielikums_studiju_plani_LV.rar
Descriptions of the study courses/ modules	5_appendix_course_description_ENG.rar	5_piel_kursu_apraksti_LV.rar
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	AAP_BAK_ENG.pdf	AAP_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	agreement_RTU_LLU.rar	vienosanas_RTU_LLU.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN_change.docx	LLU_apliecinajums_Arhitekturas_buvniecibas_virzienam_precizets.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_Ainavu_arhitektura_un_planošana_AIP_atzinums_EN.docx	bak_stud_progr_Ainavu_arhitektura_un_planošana_AIP_atzinums.docx

Civil Engineering (47582)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Civil Engineering</i>
Education classification code	<i>47582</i>
Type of the study programme	<i>Professional master study programme</i>
Name of the study programme director	<i>Jānis</i>
Surname of the study programme director	<i>Kreilis</i>
E-mail of the study programme director	<i>janis.kreilis@llu.lv</i>
Title of the study programme director	<i>Dr.sc.ing.</i>
Phone of the study programme director	
Goal of the study programme	<i>The objective of the study programme is to prepare highly-qualified civil engineering specialists for working at construction organizations and designing offices, as well as state and municipal administration institutions, who are capable to independently solve non-traditional engineering matters and carry out research work.</i>
Tasks of the study programme	<i>To ensure opportunities to continue studies for specialists who are directly related to construction, designing of buildings or construction science, have acquired higher professional education in civil engineering and wish to continue studies.</i>
Results of the study programme	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> <i>• are able to show appropriate knowledge and understanding of the respective area of civil engineering, also working in contact with different areas of civil engineering;</i> <i>• are able to orient in sources of civil engineering and general technical information.</i> <p><i>Skills:</i></p> <ul style="list-style-type: none"> <i>• are able to use independently the acquired theoretical knowledge for carrying out research and professional work;</i> <i>• are able to explain and discuss in an argued manner topical professional aspects of the civil engineering sector;</i> <i>• are able to independently direct the development of own competences and specialization, carry out research work and introduce innovations in order to solve technical and organisational problems in areas of civil engineering.</i> <p><i>Competencies:</i></p> <ul style="list-style-type: none"> <i>• are able to formulate competently and analyse critically professional problems related to areas of civil engineering, substantiate decisions and assume responsibility;</i> <i>• are able to integrate knowledge in areas related to civil engineering, contributing to generation of new professional knowledge and development of methods of professional activity;</i> <i>• are able to show understanding of and ethical responsibility about the impact of the professional activity on environment and society.</i>

Final examination upon the completion of the study programme	<i>State examination - elaboration and defense of master's thesis.</i>
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Study programme forms

Full time studies - 1 years - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	<i>1</i>
Duration in month	<i>0</i>
Language	<i>latvian</i>
Amount (CP)	<i>40</i>
Admission requirements (in English)	<i>Professional bachelor's degree in Civil Engineering or second level professional higher education in Civil Engineering where the study process have lasted at least for four years (240 ECTS)</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Master Degree in Civil Engineering</i>
Qualification to be obtained (in english)	<i>-</i>

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 complies with the Cabinet Regulations No. 512 of August, 26, 2014, "Regulations on the State Second Level Professional Higher Education Standard" (Appendix No. 1).

The civil engineering education implemented by Latvia University of Life Sciences and Technologies (LLU) has more than 45 years of experience. Until 2016, the academic Master's study programme "Civil Engineering" was implemented, the duration of which was 2 years, and which is currently closed. During the reporting period, the academic Master's study programme has been replaced by a professional Master's study programme "Civil Engineering", which is licensed with the Decision No.66 of the Study Programme Licensing Commission Meeting of 15 May 2015 and is included in the study direction "Architecture and Civil Engineering", implemented by LLU. The period of implementation of the new programme in full-time studies is 1 year. The establishment of the new programme was based on:

- New challenges in various fields of civil engineering that were marked by the amendments to the Construction Law, made in 2014. As a result of these amendments, the objectives and tasks, as well as thematic specializations of the programme had to be revised.
- Suggestions of graduates of the academic Master's programme and employers, which were aimed at shortening of the duration of studies and a more closer link to practice in construction, because all students of the Master's studies are already working in the sector - in design and expertise offices, and at construction companies.
- The relatively long duration of the professional Bachelor's studies (4.5 - 5 years), which allows shortening the duration of Master's studies and put more accent on the opportunities to specialise in any of the programme directions - Construction Materials and Structures, Building Technology and Management; also to acquire study courses that are especially relevant at the current stage of construction development - Wood Materials and Structures, Building Energy Audit, and Engineering Acoustics.
- The overall trends in the higher education in civil engineering, because concurrently with the changes made to the Master's programme implemented by LLU, also the other Latvian university that offers Master's studies in civil engineering - Riga Technical University (RTU) - started a 1-year Master's study programme.

The parameters of the Professional Master's study programme "Civil Engineering" **have not changed** since the licensing and accreditation in 2015.

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.

Since the period of implementation of the professional Master's study programme "Civil Engineering" in full-time studies is 1-year, **the number of enrolled students and the total number of students in the programme are equal** – on average, from 8-15 students each year (Figure 1).

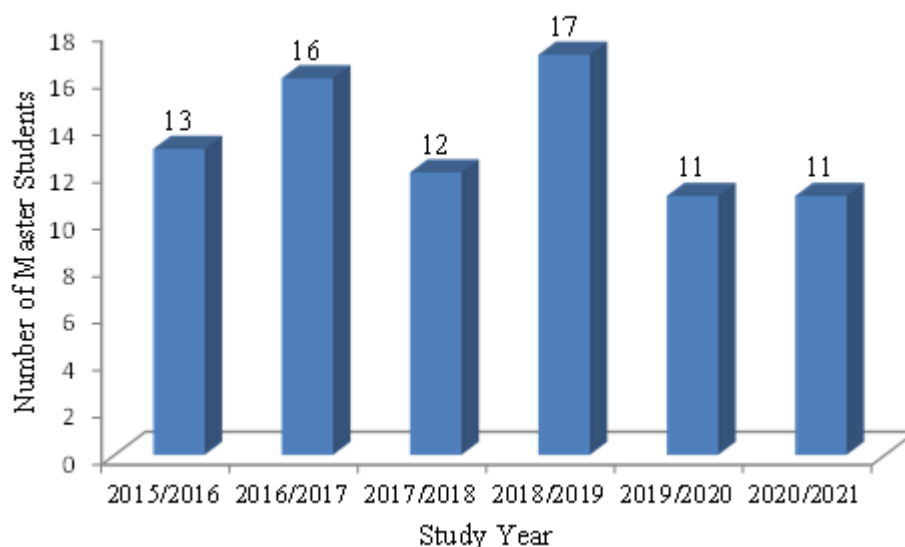


Figure 1. Number of Master students by academic years

According to the admission rules, the program admits persons who have a professional Bachelor's degree in Civil Engineering or professional qualification in Civil Engineering (Civil Engineer), acquired in study programmes, the duration of which in full-time studies is at least four years (160 CP= 240 ECTS). Meeting these requirements is ensured only by two higher education institutions in Latvia – LLU and RTU. Therefore, practically all students of the Master's study programme are graduates of undergraduate studies of LLU VBF, and with rare exclusions – graduates of undergraduate studies of RTU.

The choice to continue studies in a Master's study programme after completing undergraduate studies is determined by several factors:

- The desire to build the career at the workplace, willingness to deepen the knowledge in any of the specializations offered by the programme;
- Purposefully integrate into academic and research work, continue studies in a doctoral programme and build the academic career at the University. For example, in the 2020/2021 academic year, 16 graduates of LLU master's degree programs (former academic programme and existing professional one) in civil engineering were involved in the implementation of LLU civil engineering study programs at all levels, including four graduates of the professional master's program "Civil Engineering" licensed in 2014 and submitted for accreditation in this particular report. Of all the master's degree graduates involved in the implementation of civil engineering study programs, 6 are currently studying in the doctoral study program "Civil Engineering" (LLU) or are candidates for a scientific degree;
- The market situation in the country and the political and economic regulations adopted in the country. Due to changes in economic situation in the construction sector and in the country in general, the interest in continuing studies in a Master's programme or lifelong education increases;
- Suggestions, proposals from the employer;

- A person's desire for professional development.

Lectures and other classes during full-time studies are organised in person on Thursdays, Fridays and Saturdays, which allows combining the studies and job. And, as the gained experience shows - majority of students quite successfully combine their job with full-time studies, students do not form study debts and they successfully obtain state-funded budget places.

The drop-out rate (on average 3-5 students per year) is mainly affected by the very intensive study work in the acquisition of theoretical courses and the development of the experimental work during one year. In such cases, students use **an academic leave of absence**, which must also be used by students who have chosen a more complex research topic, which has not been possible to implement within one year (program implementation time). Taking into account this aspect, the topics of master's theses selected by master's students are currently being revised more carefully, so that the research part can be implemented within the one year.

Most students successfully integrate into the study process and submit their Master`s Thesis in time. Every year, an average of 6 - 14 **students graduate** from the study programme.

Statistical data on students of the Professional Master`s study programme "Civil Engineering" are available in Appendix No.2

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 professional Bachelor's study programme "Civil Engineering" reflects the regulatory framework and versatile nature of civil engineering, which is included in the plan of the study programme in the form of study courses and topics. Professional Master's study programme "Civil Engineering" includes both basic topics of the construction area, related to development of building materials and research of their qualities, building structures, organisation and technologies of construction works, and several unique directions, implemented only at LLU. In cooperation with LLU Faculty of Agriculture, Forest Faculty, Faculty of Engineering and the Faculty of Information Technologies, such directions as use of wood in construction, use of various bioresources (flax, hemp, wood residual materials etc.) in development of new, innovative composite building materials and research of their qualities, energy auditing of buildings, energy management and acoustics of buildings, are implemented. It has to be noted that LLU **offers studies in the field of civil engineering at four levels** (1st level, Bachelor`s studies, Master's studies and doctoral studies), ensuring reciprocal succession and an opportunity to continue studies at a higher level.

The objective of the study programme is to prepare highly-qualified civil engineering specialists for working at construction organizations and designing offices, as well as state and municipal administration institutions, who are capable to independently solve non-traditional engineering matters and carry out research work. The objective corresponds to the acquired professional Master's degree in Civil Engineering, as it highlights the practical orientation of the programme and is closely related to conducting applied studies, which can be used in various fields of practical construction.

In order to ensure achievement of the objectives of studies, a well-considered **plan of the study programme** (Appendix No.3) is developed, for implementation of which highly-qualified teaching

staff is attracted, who implement these objectives and tasks within the framework of programmes of separate courses. According to requirements of the CM Regulations No.512, the study plan is comprised of separate blocks, which include the following study course blocks:

- compulsory courses in the volume of 9 CP (13.5 ECTS), which highlight the general trends in the construction sector and the problems to be solved at the Master's level (Research Methodology and Data Analysis; Construction Project Management; Finite Element Method, as well as according to the specialization - Advanced Methods in Structural Analysis ; Building Technology and Management; Building Physics Special Course);
- restricted elective courses in the total volume of 5 CP (7.5 ECTS) (according to each specialization - Building Materials and Structures; Building Management and Technologies; Energy Audit and Energy Management of Buildings; Acoustic);
- traineeship Research in Civil engineering in the volume of 6 CP (9 ECTS);
- Master thesis and state examination in the volume of 20 CP (30 ECTS).

The parameters of the study programme are linked by the **programme content**, which is developed for fulfilment of the objectives and tasks of studies. Consequently, the outcomes of studies to be achieved ensure acquisition of knowledge, skills and competence necessary for professional activity according to the knowledge, skills and competence corresponding to the Level 7 of the Latvian Qualifications Framework and the requirements of the Cabinet Regulations No. 512 of 26.08.2014. The study programme corresponds to the second level professional higher education national standard as stipulated by the Cabinet Regulations No. 512 "Regulations on the Second Level Professional Higher Education Standard".

An integral precondition for qualitative preparation of specialists – **enrolment conditions**, which stipulate that for commencement of studies the candidate shall have acquired the professional Bachelor's degree in Civil Engineering or professional qualification in Civil Engineering (Civil Engineer), acquired in study programmes, the duration of which in full-time studies is at least four years (160 CP). Such requirements ensure that the students of the Master's study programme have sufficient prior knowledge, and they are capable of acquiring the compulsory courses within a period of one year and successfully studying the selected specialization courses. The enrolment requirements are also linked to **the tasks** of the study programme - to ensure opportunities to continue studies for specialists who are directly related to construction, designing of buildings or civil engineering science, have acquired higher professional education in civil engineering and wish to continue studies. Considering the fact that majority of students are graduates of LLU civil engineering professional Bachelor's study programme or second level higher education study programme, the choice of specialization and the topic of the Master Thesis is often related to the research elaborations during undergraduate studies. The next influencing factor in the choice of specialization and topic of the Master Thesis is the existing workplace and construction areas related to the workplace. The aspects of support for continuing the research directions commenced already during the undergraduate studies also in Master's studies involve the informative and experimental base previously familiarised with, laboratories and equipment, as well as the leading teaching staff in the specific topics.

Achieving the programme objectives and completing the tasks, i.e., elaboration and defense of the Master Thesis in front of the commission, the student receives a grade, on the basis of which the commission grants **the professional Master's degree** to the candidate. By acquiring the professional Master's degree, the programme **outcomes** are achieved, and the graduates:

- are able to show appropriate knowledge and understanding of the respective area of civil engineering, also working in contact with different areas of civil engineering. Are able to find, select, study and apply an appropriate sources of scientific and technical information ;

- are able to use independently the acquired theoretical knowledge for carrying out research and professional work. Are able to explain and discuss in an argued manner topical professional aspects of the civil engineering sector. Are able to independently direct the development of own competences and specialization, carry out research work and introduce innovations in order to solve technical and organisational problems in areas of civil engineering;
- are able to formulate competently and analyse critically professional problems related to areas of civil engineering, substantiate decisions and assume responsibility. Are able to integrate knowledge in areas related to civil engineering, contributing to generation of new professional knowledge and development of methods of professional activity. Demonstrates understanding of and ethical responsibility about the impact of the professional activity on environment and society.

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 civil engineering sector development strategy contains an indication to deficiency of highly-qualified specialists and managers in the sector. This statement is also confirmed in the framework of LLU research project No. 8.2.3.0/18/A/009 carried out in 2020 (SIA "Dynamic University"), as well as in the study on the trends of workforce demand conducted by the Ministry of Economics in 2019. The MoE labour market forecasts until 2030 provide for stability or small increase in the workforce demand for highly-qualified specialists (increase by +3%). Also the results of survey of employers in the sector "Construction of buildings" indicate to possible increase in the demand for workforce: 33% of employers have indicated that the demand for highly-qualified specialists will increase significantly. Forecasting the demand for a longer period in the construction sector is difficult. However, from the point of view of experts, the most likely scenario is that the increase in the demand for workforce will continue with possibility of cyclical fluctuations, which are inherent to the construction sector in general, considering its sensitivity to changes in the economic situation in general. The labour market in the construction sector is strongly affected by the overall economic development, EU funds planning priorities and large infrastructure objects (for example, Rail Baltica), which comprise a significant part of state orders in civil engineering.

To meet the demand of the sector for the number of specialists and increase in the quality of professional qualification, it is required to improve civil engineering education and the professional qualification system. In the nearest 10 years, the engineering knowledge of the civil engineering sector will have to integrate with new competences: **ICT technologies, smart technologies, energy efficiency, passive buildings**. Institutions offering civil engineering education have to

improve their structural analysis and new technology programmes and simultaneously introduce the new social and digital competences. While improving the study programme and shortening its duration, also the plan of the study programme and content of study courses were revised according to topicalities and trends of the sector. The main topicality for the coming years is integration of the sector with information and communication technologies (ICT), BIM (Building Information Model) platforms – research, designing, construction, supervision and management in a unified digital communication platform), which will improve the quality of projects and will make the construction organisation, transition of the building information system (BIS) to mandatory digital circulation of documents in the civil engineering sector, as well as introduction of other innovations. The topicality of introduction of BIM is also marked by more than 20 different Latvian institutions (professional organizations, ministries, academic and scientific institutions, etc.), including LLU, signing BIM roadmap in the autumn of 2019, which provides for measures for integration of BIM into the study process and practical implementation of projects. Introduction of BIM in LLU Architecture and Civil Engineering study direction requires significant resources. Therefore, over the course of the last years, through attracting funds of the European Union, the Faculty of Environment and Civil Engineering has set up high performance computer classes and acquired the software necessary for BIM in order to introduce BIM into the study content. To improve the professional skills and knowledge in BIM area, the responsible teaching staff in the programme have completed traineeship at companies that are using BIM, and have participated in training courses in Latvia and abroad. BIM thematic blocks have already been integrated into all levels of studies and content of programmes, where BIM is successively observed within the framework of various topics. Students become acquainted with modelling basics in 3D environment already in the Bachelor's programme. In the Master's programme, students gain in-depth understanding of the capabilities of using these programs in theoretical analysis and visualization of various structures. In the area of construction organisation, students learn methods of efficient management, analysing examples of BIM implementation in Latvia and abroad (for example, in the study course *Building Technology and Management*).

The content of the professional Master's study programme "Civil Engineering" also coincide with the topical international strategies, for example, **the European Green Deal**, which, in its turn, is linked to **the Strategy of Sustainable Development of Latvia** and several initiatives based on introduction of circulation economy in Latvia. Also **the Development Strategy of Latvia University of Life Sciences and Technologies** for 2015-2022 is specifically focused on the improvement and extending of the range of offer of those study programmes that prepare specialists for the perspective sectors of bioeconomy included in the Latvian Smart Specialization Strategy, including construction based on use of biomaterials. These are topics related to ecological construction and energy efficiency, use of wood and various local biomaterials in construction, development of new innovative building materials, for example, composite materials on foam gypsum basis with hemp fibre reinforcement. Also, a permanent topicality is safety and acoustics of buildings, as well as other civil engineering aspects ensuring the quality of living environment, addressing prevention of threat to health and life of every person.

The research programme of **the Development Strategy of Latvia University of Life Sciences and Technologies 2015-2022** sets the priority topics of the construction area "*Sustainable building, development of new, innovative building materials and construction products, research of their performance characteristics*", "*Safety of building structures and behaviour under long-term loads*", and these topics are also highlighted in the content of study courses, programme specializations and topics of Master's Theses. Within the framework of these topics, students of the Master's study programme participate in studies implemented by the leading researchers of LLU in the construction area and in contract works with entrepreneurs.

The topicality and conformity of each **study course** to the sectoral needs, as well as the scientific trends, are substantiated and examined by the teaching staff during the introductory classes of the course. The formulated topicalities and sectoral needs are also integrated into the extended course plan and the study outcomes to be achieved. The possibility to specialise already during the first semester of studies significantly helps students to focus on studies in the selected direction. The content of study courses is periodically updated, the teaching staff revising and updating the content of their study materials, following the latest sources of information – Internet, libraries, periodicals. The changes are regularly entered into the informative system of LLU. Plan of the Professional Master`s study programme Civil Engineering is available in the Appendix No.3

In the of the **Development Strategy of Construction Industry in Latvia 2017-2024**, the main development objectives of the sector are determined with the decision of the Construction Council of Latvia (27.04.2020), incl. sectoral activities in the area of education – education auditing, assessment of the level of professional qualification, representation of companies in structural units of advisors of educational institutions, activation measures of students` places of traineeship. The planned activities in the area of education are directly related to implementation of the Master`s programme – experts and specialists in the sector (including civil engineering graduates of LLU) participate in the study process as guest lecturers, are represented in the state examination commission and provide assistance on the issues of organisation of research traineeship.

Participation in local and international conferences develops communication and language skills of students, broaden their horizon and highlight the content of study courses in another – sectoral topicalities – context. For example, the agenda of conferences in the recent years involves a topical sectoral problem – building information modelling (BIM), which makes also the teaching staff to replenish and reorganise the programmes of their study courses in a way that allows maintaining a logical feedback among the diverse areas in in construction.

A significant role in maintaining the topicality of the content of professional Master`s studies and linking it to the needs of the labour market is given to **active involvement of the young teaching staff in construction practice** as certified specialists. Frequently, also the young students of the Master`s programme have chosen to continue higher level studies already as certified professionals.

Each year, several topics of Master Theses are proposed exactly at the workplaces of students of the Master`s programme. So, it can be said that each defended Master Thesis serves as a certain contribution to the development of the sector. As examples can be mentioned the Master Theses *"Impact of manufacturing and design imperfections on the resistance of composite steel-concrete columns"*, *"Open format file application for building information model data exchange"*.

The award of a professional master's degree is based on:

- evaluations at the meeting of the department, which approves the topicality of the topic chosen by a student and its compliance with the current problems of the field;
- the results of successful mastering of learning outcomes of the study programme, publications or theses related to the topic of master`s thesis, and their approbation in local and international conferencies;
- the conclusion of the State Examination Commission regarding the significance of the final work in the relevant construction industry and a student`s compliance with the requirements for the award of the degree taking into account reviewers` assessments. Each master's thesis has two reviewers (one represents the construction industry, another one represents academic environment). It is the professionals of the construction industry who help to assess the topicality of the final theses, determining whether the award of a particular master's degree is based on the achievements and findings of the construction 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 course programmes and their content are developed in a way that allows achieving the **objective** of the professional Master's programme "Civil Engineering" - to ensure preparation of highly qualified civil engineering specialists for working in construction business, designing offices, as well as state and municipal institutions, and who are capable of solving engineering problems independently and promoting development of Latvian rural and urban construction.

The study program is focused on in-depth acquisition of special knowledge on building material properties and structures in connection with new construction products and modern technologies, construction work organization issues, applying new solutions to improve energy and acoustic functions of building structural components and engineering systems. For this purpose, the study programme with the total volume of 40 CP (60 ECTS) is divided into 3 main stages:

- theoretical study courses – 14 CP (21 ECTS),
- traineeship – research in civil engineering – 6 CP (9 ECTS),
- elaboration and defense of the Master Thesis – 20 CP (30 ECTS).

Whereas the theoretical study courses are divided into:

- compulsory courses – 9 CP (64.3%) and
- restricted elective courses – 5 CP (35.7%).

Specialization is possible within the programme:

- Building Materials and Structures
- Building Management and Technologies,
- Energy Audit and Energy Management of Buildings,
- Acoustics

Acquisition of specialization takes place in • restricted elective courses in the total volume of 5 CP (7.5 ECTS), as well as traineeship "Research in Civil Engineering" in the volume of 6 CP (9 ECTS), and, finally, the Master Thesis in the volume of 20 CP (30 ECTS).

Such a flexible programme arrangement allows achieving simultaneously the general objectives and tasks of the programme and specialising in a narrower area, which allows going deeper into one of so many problems in civil engineering.

The tasks for implementation of the study programme – to give an opportunity to civil engineers and professional Bachelors to raise their qualification and prepare construction specialists knowledgeable in the modern construction solutions and technologies in the following areas of civil engineering: building materials and structures; organisation and technologies of construction works; energy auditing and energy management; acoustics.

The Appendix No. 4 contains **mapping of study courses**, which displays the connection between the planned outcomes of study courses and the outcomes to be achieved within the study programme. Descriptions of study courses are available in the Appendix No.5.

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 studies are implemented in accordance with **LLU Regulation of Studies** (<https://www.llu.lv/lv/studijas> (in Latvian); <https://www.llu.lv/en/study-guide-documents> (in English)).

The study plan provides a system of acquisition of mutually subordinate study courses – acquisition of each study course is based on the knowledge gained in the previous study courses. Such a plan of study courses ensures logical and successive acquisition of knowledge. The full content of the offered course is indicated in the extended course programme, which also shows the division of the period of studies into semesters both for full-time studies, and part-time studies.

All descriptions of study course are compiled in one document, which is available to all users of LLU Information System (LLU IS) (<https://lais.llu.lv/pls/pub/kursi.startup?l=1> (in Latvian) and <https://lais.llu.lv/pls/pub/kursi.startup?l=2> (in English)). Regulations and procedure of development of a new study course on LLU IS, as well as making changes to the study course, are regulated by an order of the Vice-Rector for Studies of LLU (<https://www.llu.lv/lv/ar-studijam-saistitie-dokumenti> (in Latvian)).

The study plan provides for a specific volume of contact classes, i.e., lectures, practical works, seminars, laboratory works, but the main accent is put on promoting independent work of students. **The volume of independent work of students** is set considering that the total volume of hours (classroom classes + independent work of students) corresponds to 1 CP (1.5 ECTS) = 40 hours.

A significant part of the independent work is comprised of preparation of presentations, , and development of the Master Thesis. To master public speaking and discussion skills, presentation of traineeship reports, as well as pre-defense of Master thesis is organised.

Control of knowledge is implemented with a purpose to achieve regular work throughout the semester, so that master students acquire knowledge and skills for the development of a master's thesis in a timely and purposeful manner. LLU Study Regulations (https://www.llu.lv/sites/default/files/2021-05/Studiju_nolikums_2021.pdf (in Latvian) and https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf (in English)), envisage the **evaluation** of students' works, using qualitative and quantitative evaluation methods:

- **For the qualitative assessment**, 10-point scale criteria are used (*1 to 10 points, successful assessment starting from 4 points*) or the pass/fail assessment .
- **The quantitative indicator** is the volume of the study course in credit points (1 CP = 1.5 ECTS). Every semester the student acquires study courses in the amount of 20 CPs (30 ECTS). In total, the study program is mastered if the study courses in the amount of 40 CPs (60 ECTS) have been successfully completed.

In the recent years, a significant role in organisation of studies and control of knowledge is assigned to **e-studies**. The teaching staff actively use e-studies for both as a platform for presentation of

study materials and for providing consultations to the student online.

The **principles of student-centered education** in the study programme are implemented as follows:

- The principle of student-oriented education imposes an obligation on the teaching staff and the Faculty to provide students with all the necessary information (learning literature, methodological aids), ensure modern and efficient base for laboratory and research works. A significant aspect for students is the possibility to choose a specialization in one of the offered directions, which allows conducting in-depth research in an area of interest.
- Respecting the needs of students, the study environment accessible to each student is ensured, the accessibility of the environment in the premises is also ensured.
- Lecturers are available for students for communication not only during classes, but also during consultation hours, as well as for communication in e-studies and by e-mail.
- In order to structure the students' learning process, course programmes have been prepared for each study course with the topics scheduled for each week. At the beginning of the study course, students are introduced to the schedule and topics of classes, as well as the conditions of the completion of the study course.
- The review of student complaints is regulated by the LLU Study Regulations (https://www.llu.lv/sites/default/files/2021-05/Studiju_nolikums_2021.pdf (in Latvian) and https://www.llu.lv/sites/default/files/2021-05/Study_regulation_2021_EN.pdf (in English)), but complaints are also reviewed by the commission. In addition, students are invited to seek assistance by escalating the issue, starting from the director of the study programme, the head of the department, vice-dean, dean and, finally, the vice-rector for studies.
- Ensuring mutual respect and participation of students and lecturers, the Code of Ethics of the LLU has been developed (<https://www.llu.lv/lv/noteikumi> (in Latvian); https://www.llu.lv/sites/default/files/2016-06/CODE%20OF%20ETHICS_2005_English.pdf (in English)).
- Students of the programme can participate in the improvement of the study process in cooperation with the Student Self-Government, which delegates its representatives to the Council and the Scholarship Council of the Faculty of Environment and Civil Engineering, LLU Council and Senate.
- Students participate in surveys, discussions and evaluate the study process.
- Student evaluation criteria are defined in the description of each study course (*available to students electronically*), as well as each lecturer introduces students to the evaluation criteria when starting the specific study course.
- The study results and the obtained assessments are explained by the lecturers, giving the students feedback on the submitted works.

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.

A significant role in the Professional Master's study programme is assigned to the traineeship "Research in Civil Engineering" – volume: 6 CP (9 ECTS). **The research traineeship is related to**

the specialization direction and the topic of the Master Thesis. When the master's student has chosen the specialization, department, in which to develop the Master Thesis, and the department has approved the scientific supervisor and topic of the Master Thesis, the master's student shall discuss the research traineeship issue together with the supervisor.

The organisation of the traineeship at the University is implemented in accordance with the LLU Traineeship Regulation (Senate decision No.8-130 of November 12,2014) and in accordance with the traineeship programme approved by the department. Leading department – Department of Architecture and Building (ARBU) or the Department of Structural Engineering (BUVK) – appoints the traineeship supervisor and approves the traineeship programme. Then an agreement is concluded, indicating the place and time of traineeship (the agreement is signed by a representative of LLU, representative of traineeship enterprise, and the trainee).

The student is entitled to choose the place of practice, provided that it allows to meet the requirements of the practice programme. The student is sent to the practice by the Dean's order. When sending a student to the practice, safety briefing is obligatory. After submission of the practice report to the department and defending of the report, the practice is evaluated by "test with a grade".

To achieve the aim of the traineeship tasks:

- an individual traineeship task is drawn up for each student, taking into account the specifics of the traineeship place and the preconditions;
- Within the framework of the traineeship agreement, the department agrees with the management of a traineeship company that a master student is provided with an opportunity to obtain information about the company's experience in research, to use its production equipment for experimental samples, to use its professional software for data processing, etc.

A cooperation agreement on ensuring of places of practice is concluded with several organizations on ensuring of places of practice: SIA "Zemgales tehnoloģiskais centrs"; SIA "Baltic Costruction Consultancy"; SIA "Kasunk Studija"; "Lafivents SIA"; "PERI SIA"; SIA "Ozolnieku KSDU". Also an agreement on cooperation in organisation of practice is concluded with the management of AS "UPB", "SIA RUKKI Latvia" and SIA "SAKRET".

As can be seen in the mapping of study courses (Appendix No. 4), the traineeship tasks are closely linked to the defined outcomes to be achieved in the study programme, especially –competences to independently set and solve research tasks in chosen direction of Master thesis.

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.

Over the period from the study year 2016 – 2020, in total 42 theses have been elaborated and defended. Topics of master's thesis are related to the topicalities of the field described in more detail in Chapter 2.1. Below is the analysis of the topics of the final works (Figure 2).

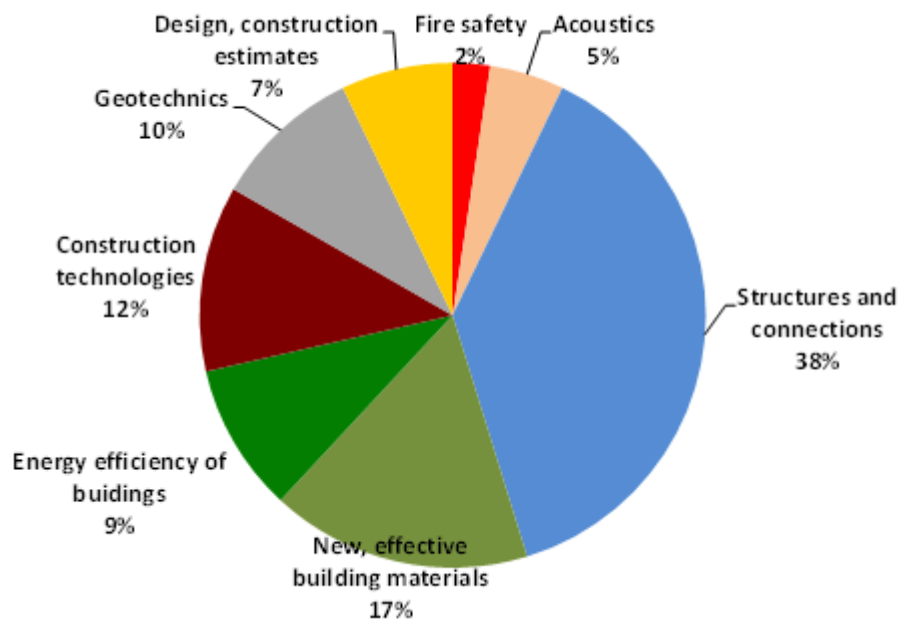


Figure 2. Topics of Master thesis

As can be seen, majority of topics of theses are dedicated to studies of structure elements and functioning of their units, as well as studies of mechanical properties of new, efficient materials. This can be explained with in-depth interest and active involvement of master students in research of the Building Materials and Building Structures Scientific Laboratories. In the recent years, through attracting the European Union funding, the equipment of scientific laboratories has been improved significantly and new equipment has been acquired, which allows conducting original and unique studies.

The listing of topics of theses includes all specializations of the study programme, which indicates to diversity of the demand of the labour market and that these topics have been suggested by the construction industry.

In accordance to the Regulation on the Final Examinations (the Senate's decision No.8-65, April 9th, 2014), **professional master theses are evaluated** on the basis of:

- grades of the acquired study courses (the average grade);
- the evaluation of two independent reviewers who have a doctoral degree in engineering sciences or respectful professional experience and a master's degree in engineering sciences;
- the evaluation of the State Examination Committee (7 members). The head of the committee and at least half of the members of the committee represent other universities, a professional organization of the industry or a employers. The decision of the awarding of the degree is made by the committee in the closed meeting by a simple majority of votes, by open voting. The evaluation is calculated in 10-point system. The grade is given as an average weighted out of ten assessments: an average grade, two reviewers' grades and grades of seven members of the Examination Committee;
- a supervisor of the master thesis submits a recommendation (positive, negative), but does not give a grade.

Several **Master Theses have received awards** from the sector, for example, in 2019 two master's programme graduates were awarded by "Construction Industry Award" in the nomination "Student of the year" for the excellence of their master theses on topics "Comparison of geotechnical investigation methods of static probing and flat dilatometer test" and "Fire safety modeling and

solutions of timber buildings – egress of pre-school education facilities”. This proves the topicality of these topics and their practical application in resolving problems in the sector.

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.

Surveys of students are related to quality of the work of the teaching staff and study courses. Such surveys are carried out twice per study year at the end of each semester. Evaluating the results of the survey and drawing conclusions, work continues on improving the approaches to teaching study courses. For example, to understand whether improvements in the organization of distance learning during the Covid-19 pandemic constraints in 2019/2020. and in the study years 2020/2021 have been effective, a student survey was conducted. Its results show that 62.5% of students are completely satisfied, more satisfied than dissatisfied - 37.5% with the university and fully satisfied (52.5%) or more satisfied than dissatisfied (40%) with the choice of the study program. Student satisfaction with studies marks the positive impact of the improvements made on the implementation of the study process in exceptional circumstances.

Surveys of employers (at designing and construction companies), conducted in 2017, showed that civil engineering graduates are mostly assessed positively and their abilities to fulfil the assigned duties after completion of studies are assessed as “fully achieved” or “rather have achieved”. The level of required abilities is also assessed as “rather not achieved” for separate graduates in the section “Required practical skills and abilities to use them”. In general, not much critical feedback on the quality of studies has been received, but suggestions have been received for improvement of the programme content, drawing up a plan of classes, ensuring opportunities to combine studies in the Master’s programme with job, the schedule of research work, etc.

The cooperation between the Faculty of Environment and Civil Engineering and entrepreneurs in the sector, majority of whom are graduates of civil engineering speciality, is developed since establishment of the programme. Graduates of the programme are attracted as visiting lecturers, reviewers of Master Theses, members of the examination commission (MEK). Each year, representatives of institutions and organizations of the sector are invited to participate in the commission – from the Latvian Association of Civil Engineers, municipal construction organizations and designing offices. A significant role in the study programme is allocated to the practice “Research in Civil Engineering”, for implementation of which agreements with companies are concluded.

Suggestions and recommendations of experts are taken into account in assessment and improvement of the study programme, for example, **recommendations of foreign experts** attracted within the framework of the European Union funds project 8.2.3.0/18/A/009 “Improvement of Management of Latvia University of Life Sciences and Technologies”.

The **results of the students’ survey are used** in organizing group discussions in the staff meeting of the department or individual talks with staff members with the aim to achieve the implementation of the principles of student-centered education.

Traditionally, a more negative feedback has been received from students who have not been able to combine their work with a tight learning schedule, as well as who have problems in connection with the acquisition of certain courses of the programme within the limited time. As a result, classes

and lectures for master students are planned only at weekends, but the teaching staff members of the departments offer individual consultations and actively participate in research work.

The teaching staff members of the departments not only observe the principles of student-centered education (see Section 2.3 of the report of the study programme), but also the limited elective study courses purposefully emphasize topics that are related to individual research of master students.

As it was mentioned in the Section 1.1 of the report of the study programme, surveys of students and graduates have prompted the creation of a professional master's degree study programme at LLU. Surveys showed that most students and graduates associate their careers with working in a professional field - design, construction 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.

Taking into account the implementation period of the program - 1 year, students do not use the ERASMUS + mobility program.

Incoming mobility of master students was not implemented during the reference period.

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 resources of the study program consist of three groups - equipment, software and literature. **The informative base** for the study programme is ensured by the teaching staff of departments with their methodological elaborations, the Information Centre of the Faculty, as well as LLU Fundamental Library (FL), incl. interlibrary services. As can be seen in the catalogue of FL, since 2013 the library collection has been replenished with more than 280 titles in the area of civil engineering and engineering sciences, incl ~220 titles in English.

An invaluable source of information nowadays are websites with information at different levels - handbooks, study literature, available databases for searching of scientific information.

Industry publications for studies and research work are available in the Subscription of the

Fundamental Library of the LLU (LLU FB), as well as Subscription of Study Literature and in the Reading Room,. Reference literature and bibliographic references on various issues related to civil engineering and other branches of science are available at the Bibliographic Information Department. To search for information sources that are not available in the library collection, students can use the subscribed databases in the LLU network or outside the LLU network by using the personal accounts in the LLU information system (LLU IS). Information can be obtained at the Reference and Information Center of the Fundamental Library of the LLU, as well as interlibrary loan services can be used. The search engine LLU Primo Discovery, online databases BIS Aleph500, online databases created in the Fundamental Library of LLU (8 databases of different levels) are available for searching of scientific literature. When using the LLU IS user account, a number of subscribed databases are available: CAB Abstracts; CRC Press e-books; EBSCO databases; EBSCO eBook Academic Collection; ScienceDirect journals; Scopus; Web of Science and others. Faculty and students are informed about databases to which access is granted on a temporary basis. Databases of lecturers' publications and doctoral theses have also been created. The staff of the library provides consultations on current events, as well as advises students on searching for scientific information. The informative and methodological base of the LLU is detailed, transparent, and structured so that students can quickly obtain all the information related to their studies, get acquainted with the study course materials and study course requirements in the LLU e-learning environment, and the LLU Fundamental Library provides students with very a wide range of study and scientific literature and access to a variety of databases. The LLU Fundamental Library regularly supplements the range of various publications available to support students with sources for the acquisition of the civil engineering study programmes, as well as for research. The appendix contains books and study materials that have included in the range of materials used in the study direction during the reporting period.

Students of the Faculty of Environment and Civil Engineering may use **VBF Information Centre** that provides free access to the LLU Fundamental Library databases and specific industry literature - books, standards, scientific and industry journals; it is also possible to print large format works, such as study projects.

During the reporting period, the **study and science infrastructure in the field of civil engineering was significantly improved** by attracting funding from the earnings of the Faculty of Environment and Civil Engineering (tuition fees, etc.), ERDF projects "Strengthening research, development infrastructure and institutional capacity of LLU and its supervised scientific institutions" (No. 1.1.1.4./17/I/003) and "Modernization of STEM study programmes" (No.8.1.1.0 / 17 / I / 001), as well as from various other projects implemented at the faculty. Significant repairs have been made to improve study classrooms and laboratories; high-performance computer equipment has been purchased that supports the development of digital skills, including BIM; as well as acquisitions of equipment, tools and furnishing have been made. All classrooms necessary for the study work are equipped with the necessary technical means for conducting classes - multimedia equipment, computer equipment, appropriate software and Internet access.

In general, several **study and scientific laboratories** are involved in the implementation of the study process of the program:

Main devices and equipment of **the Structural Engineering Scientific and Training Laboratories**. In the recent years, compression testing machine type ALPHA 10-3000 HK-4SH for testing of large-scale models and high-accuracy fiber-reinforced concrete testing machine DELTA 5-300 S were acquired and mastered. The set includes a hydraulic station PA 19-280bar-WKN, management and test control system RS-C30-N-PC with software set PROTEUS. Also various measuring devices for measuring and digital registration of displacements are available to researchers. With the multi-channel tensometry set, which includes two data receivers Quantum MX

440B and MX 1615 B, it is possible to concurrently register data from 16 tensoresistors and 4 inductive displacement sensors. For testing various models of materials and building structures in terms of compression, bending and tensile strength, the universal testing device INSTRON (250 kN) is used already for many years. For the purposes of loading large, relatively full scale curved structures, a 6.0 m long power floor with two mobile frames and synchronisable hydraulic Zwick power cylinders, and a pump station with the maximum power 400 kN are available. All the power equipment is regularly calibrated once a year. The Building Structures Scientific Laboratory is equipped with a bridge crane (40 kN) and the necessary materials and tools. The researchers have access to a rebar locator Proceq SA with accessories, as well as a Smith's hammer and an ultrasound apparatus for testing of strength of materials.

The Building Materials Scientific Laboratory is provided with modern devices and equipment both for research of material production technologies, and testing of physical and mechanical properties. Researchers have access to DHR-3 rotation-oscillation rheometer, natural convection drying oven, chambers for determination of sealants vapour permeability, thermal cameras, automated particle dimensions and shape analyser and a crushing machine (mill) Pulveisette 16, Fritsch GmbH, which allow trying and developing technologies for producing new composite building materials. For research of acoustic properties of materials and structures, 4-channel acoustic measurements analyser "SOUNDBOOK", sound absorption tube, impact noise generator, ICP micropophone set, microphone calibrator NC-74, noise level meter and other devices are available. An acoustic chamber is created, which allows conducting sound absorption studies for various models of medium-sized walls and covering materials and structures. The NWWin software serves for processing of measurement data.

In computer classes, special structural analysis programs *Dlubal RFEM*, *IDEA StatiCa Steel*, *Tekla Structures*, *Axis VM*, as well as construction noise analysis software (BASTIAN), program for modelling environmental noises *SoundPLAN*, computer program *Architecture and Engineering Suite 2011* EDU NLM 10 Pack and the computer program for designing of passive houses *Passive House Planning Package PHPP 7* are available. ITF

Provision of financing. The number of state-funded study places is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for **Master's programmes is 1.5** and the social funding of one study place for Master's programmes is 164.34 EUR, the study cost **coefficient for the professional Master's programme "Civil Engineering" is 1.7** (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet Regulations No. 994 "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"), costs per student in the professional Master's programme "Civil Engineering" amount to 4321.13 EUR. In 2021, the **tuition fee** in the study program is 1200 EUR per semester, or 2400 EUR per year.

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually according to the contribution of the researchers as a result of the scientific activity. Science base funding in the amount of 50% is at the disposal of the faculty and 50% is used to cover LLU centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the Master's study programme "Civil Engineering" consisted of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%

Financing indicators of the study programme for reporting period are shown in Figure 3.

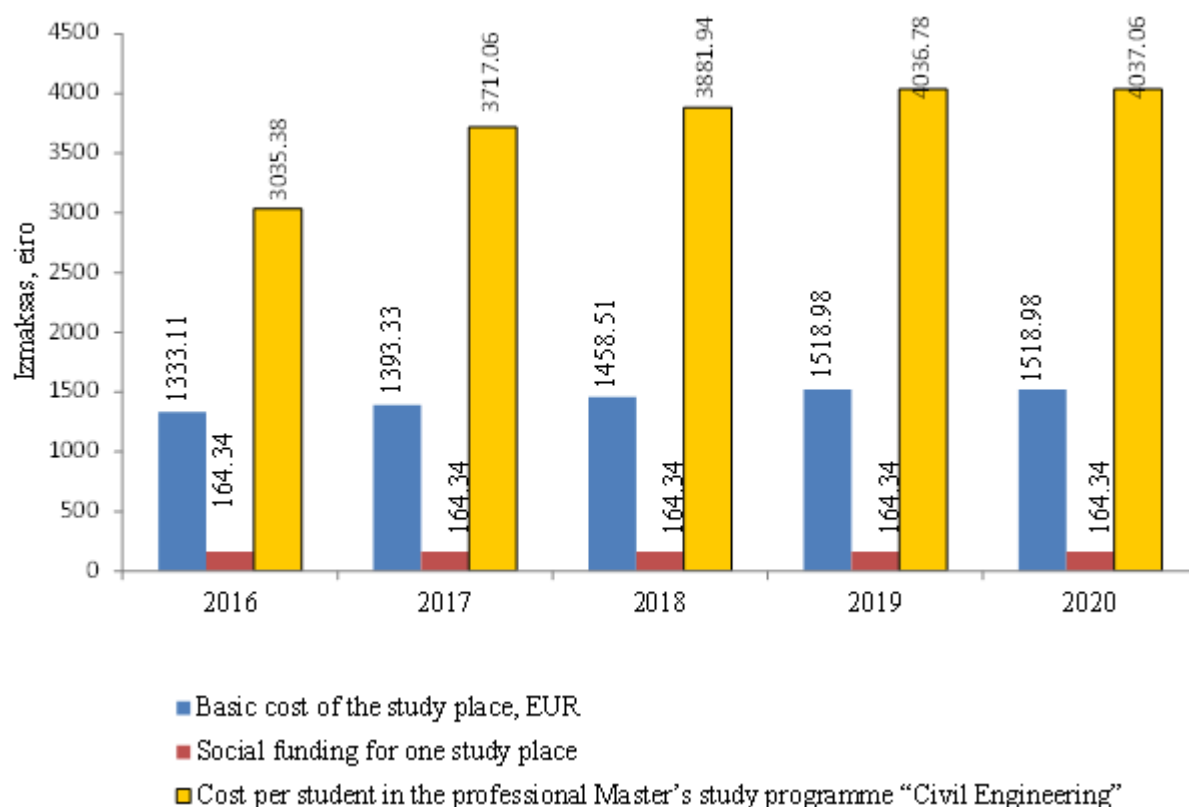


Figure 3. Financing indicators of the Master's study programme "Civil Engineering"

* 2020 and 2019. costs per student differ by a few cents, this is because each year the provision of the study coefficient in % differs slightly by few decimal places. Rounding up or down, this provision is 100%, but in figures in the contract in 2020 it was - 99.98242%, but in 2019 - 99.97517%, also in 2016 and 2015 costs per student differ in the provision of the study coefficient in 2016 - 84.45564%, but in 2015 - 84.46058%, also in 2016, 2015 and 2014 costs per student differ in the provision of the study coefficient in 2016 - 84.45564%, 2015 - 84.46058%, 2014 - 83.7295803%.

During the reporting period, funding has increased, but expenditures have also increased - the

minimum wage rate has been raised and other economic indicators have changed.. Tuition fees do not cover real study costs, as tuition fees for similar study programs in Latvia do not yet reach the level of state funding, thus requesting the actual tuition fee would significantly reduce the competitiveness of the program.

Financial support has increased during the reporting period, but so have expenditures, the minimum wage rate and other economic indicators. Paid students do not cover the state-paid budget places, because tuition fees for similar study programmes in the field of education in Latvia are not yet close to the state funding, so it would not be competitive to determine it this way, but the paid places of the study programme includes only students with study debts, except for the first year, when there are more students enrolled than there are budget places available.

Additional financial support opportunities for students in the programme

State scholarships in the professional Master's study programme until 1 January, 2020 were 99.60 EUR, but for the period from 01.01.2020 until 31.12.2021, the scholarships are intended to reach 200 EUR per month. In one study year, scholarships are awarded to an average of 2 students, according to the number of successful students, the scholarships are distributed to the students who have received the highest grades. Students in the programme also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU (Senate, Jāņa Čakstes, Kārļa Ulmaņa etc.).

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.

A total number of academic staff involved in the implementation of the professional master`s study programme "Civil Engineering" is 11 persons, that covers 1.27 full-time equivalents. The academic staff involved in the implementation of the study programme have high qualification – 81% having PhD degree and 19 % – Master`s degree. Several members of the teaching staff also have a professional practice at building organizations and designing offices as the responsible certified specialists.

Summary of academic staff involved in the implementation of the professional master`s study programme "Civil Engineering"

Position	Number	%

Professor, inc, Emeritus	4	36
Associated professor, inc.Emeritus	4	36
Assistant professor	2	18
Lecturer	1	10
Total number	11	100
Scientific degrees		
Dr.	9	81
Mg.	2	19
Total number	10	100

Changes to the composition of the teaching staff in the reporting period are mainly related to the generational change – retirement, as well as involvement of new members of the teaching in the study programme. The quantitative changes since the beginning of the reporting period are insignificant. The further development of implementation of the Master's study programme is positively characterised by participation of doctoral students of the doctoral study programme "Civil Engineering" in the study process, which also extends and updates the course programmes with up-to-date topics, for example, in areas of spatial modelling of structures, fire safety, etc.

During the reporting period, **foreign guest lecturers, as well as guest lecturers from the industry** were attracted as much as possible. Involving guest lecturers in the study process is very important, because often guest lecturers introduce students and lecturers to a very specific or narrow topic, which cannot be included in the study programme plan, but which provides important additional information. It is also important to learn about foreign experience, showing what is relevant in the field at the international level. Attraction foreign and local guest lecturers is not paid from the state funding for the study program, therefore external funding sources are required. A positive experience is the project "Improvement of LLU academic staff" (No. 8.2.2.0/18/A/014) implemented by LLU in the study year 2019/2020, a professor from the Estonian University of Life Sciences has been attracted to an employment contract at Department of Structural Engineering. The Faculty of Environment and Civil Engineering attracts foreign guest lecturers every year from the faculty's own earned funds (tuition fees) in the fields represented by the faculty. Thus, in the 2017/2018 academic year, a professor from the University of Maribor in Slovenia was attracted to an employment contract. The professor gave valuable lectures and consultations to students in the field of structural dynamic.

Every year, in cooperation with companies and graduates, guest lectures are organized for students in the 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.

The conformity of the teaching staff (academic staff, visiting professors, associate visiting professors, visiting assistant professors, visiting lecturers and visiting assistants) for the conditions of implementation of the study programme and requirements of regulatory enactments is regulated by LLU Regulation on Academic Positions (Senate decision No.10-53 of 11.12.2019).

Election for a respective academic position confirms compliance of the person's academic and professional qualification both to the study, and research work.

The teaching staff involved in the professional Master's study programme upgrade their qualification on a regular basis in accordance with LLU Higher Education Pedagogues Professional Development programme "Innovations in the Didactics of the University", participate in national and international conferences with reports and publications, read lectures and seminars for specialists of the construction sector.

Within the framework of professional development, the teaching staff participates in the following activities

- **ERASMUS + mobility** to foreign universities and research institutions;
- **professional development courses and seminars with training**, including university didactics courses;
- **conferences and seminars as participants;**
- **instructors of workshops implementing improvement of qualification for practising engineers**
- **exhibitions as visitors;**
- **maintained professional certificates;**
- **internship in companies** ESF project no. 8.2.2.0/18/A/014 "Development of academic staff".

In addition, teaching staff are active in a variety of industry organizations, associations and networks, including international organizations such as International Association for Bridge and Structural Engineering (IABSE); Green Economics Institute England, Oxford (GEI); Nordic Association of Agricultural Scientists (NJF); The European Intellectual Property Teachers' Network (EIPTN); German Institute for Construction Technology (Deutsches Institut für Bautechnik); Azerbaijan State Agency for Control over Construction Safety of the Ministry of Emergency Situations.

International experience in the field of construction education is gained by the teaching staff of the programme by participating in conferences and seminars, going on mobility implemented by ERASMUS + and other programs, and cooperating with foreign universities and their teaching staff and researchers, such as:

- **Wrocław University of Environmental and Life Sciences in Poland** conducting guest lectures, workshops, consultations, reviewing scientific articles,
- **The University of Trás-os-Montes e Alto Douro (UTAD) in Portugal** and **Wrocław University of Environmental and Life Sciences in Poland**, in organizing the international scientific International Conference on Safety and Durability of Structures (ICOSADOS) and reviewing scientific articles,
- **Aleksandras Stulginskis University** in reviewing scientific articles,
- **University of Maribor** in guest professorship, guest lectures, organization of seminars, review of scientific articles,
- Estonian University of Life Sciences in reviewing scientific articles, in guest professorship and expertise of study program,
- Vilnius Gediminas Technical University in consultancy and reviewing scientific articles.

The qualification of the teaching staff complies with the conditions of the study programme implementation and the requirements of regulatory enactments. This is evidenced by the demand for them to **read guest lectures/ participate in seminars for industry specialists**. Lectures are given in companies engaged in raising the quality of certified construction engineers, for example, SIA CMB engineering competence centre; SIA LBS konsultants; A/S UPB etc. Topics covered are related to structural engineering, project expertise and inspections; division of responsibilities in the construction process; building acoustics, the most common discrepancies and frequently unresolved issues. Practical classes in computer aided design of reinforced concrete structures, Design of composite steel- concrete structures in accordance with Eurocode 4, Design of timber structures in accordance with Eurocode 5,: I-Beams and panels of wood materials, II: Design of timber trusses, III: Timber columns, portal frames and arches.

The professional and academic qualification of the teaching staff ensures quality of lectures, as well as learning research skills at training and scientific laboratories. Thanks to the high qualification of the teaching staff, unique studies are carried out at the laboratories, using modern and complex equipment. Specialisation during the 2nd semester of studies gives more opportunities also for the teaching staff to provide in-depth information during lectures, and for students – an opportunity to focus more on own specific topic of research and obtain higher quality results and assessment of the thesis.

The qualification of **the teaching staff is appreciated by multiple awards** - writs of honour, awarded by professional organizations, awards of the Ministry of Education and Science and awards of the Ministry of Agriculture.

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.

According to the Senate Decision No. 10 – 70 of 11.03.2020 the academic work of LLU includes not only the pedagogical work, but also **research** and work on ensuring quality of the study process.

Each year the academic staff, leading researchers, researchers and scientific assistants provide information on their scientific activities and receive an assessment according to the effective criteria set by LLU Science Council.

LLU Development Strategy 2015 - 2022 sets out the priority research directions, also in the area of civil engineering:

- *Sustainable civil engineering, development of new, innovative building materials, research of their properties.*
- *Safety and performance of building structures under long-term load.*

In accordance with these research directions, the academic staff of the study programme implement the following activities, also involving students of the programme:

Studies in cooperation with companies in the sector, incl. with concluded agreements. For example:

- in cooperation with SIA “TMB Elements” and SIA “Alba Ltd”, also involving master students, who studied heat resistance of non-metallic (fiberglass) reinforcement;
- in cooperation with the timber structures design and construction company SIA “JMR-Frame”, a MA student elaborated her Master Thesis on assessment of the declared characteristics of construction products;
- in cooperation with representatives of MAPEI in Latvia and SIA “Velve MST”, samples of reinforced concrete beams with carbon plastic tapes were produced.
- with support of the company SIA “CSK Steel”, a MA student produced and tested welded steel samples for tests of bolted connections in the laboratory.
- within the framework of cooperation agreement with SIA “Inspecta Latvia” on testing of structures in the Scientific Laboratory of Structural Engineering. Agreement No. 3.2-10/TPK-25 of 2017, subject of the Agreement: “Experimental studies on the mechanical strength of concrete construction products.

Studies within the framework of projects. For example:

- scientific project Z49 “Analysis of the effect of graphene and steel short fibers on the stiffness of reinforced concrete structures” within LLU programme “Strengthening of the

scientific capacity at LLU”;

- scientific project Z37 (June 3, 2019 - May 31, 2021) “Methodology for determining the rotational stiffness modulus of moment connection of wooden elements” within LLU programme “Strengthening of the scientific capacity at LLU”;
- ERAF/SEDA project “ Efficiency of fibre reinforced cement composites in structural walls” 1.1.1.2/VIAA/3/19/487 - programme “Growth and employment” 1.1.1 support objective “To increase the research and innovative capacity of Latvian scientific institutions and their capability to attract external funding, investing in human resources and infrastructure”. Project implementation period: January1, 2020 – December 31, 2022.

Reports and articles in local and international scientific publications. For example:

- scientific International Conferences Safety and Durability of Structures (ICOSADOS) in Wrocław (2014), Porto (2016), Jelgava (2018)
- International Structural Engineering and Construction Conference ISEC in Honolulu (2013), Istanbul (2016), Chicago (2019)
- International Association for Bridge and Structural Engineering – IABSE in Madrid (2014), Vancouver (2017), Christchurch (2020-21 online)
- World Multidisciplinary Civil Engineering - Architecture - Urban Planning Symposium in Prague (2018)

Participation in international professional and scientific organizations and working groups, for example:

- Green Economics Institute (GEI),
- International Association for Bridge and Structural Engineering (IABSE),
- International Building Commissioning Standards Development Group (Working Group “Advance Building Comfort & Efficiency Commissioning Certification”),
- International Federation for Structural Concrete (FIB),
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Federation of European Heating, Ventilation and Air-conditioning Associations (REHVA).

The experience, key findings and results gained during the studies are already used in **development of new study courses and improvement of study materials of the existing courses** (development of lectures, laboratory works and methodological materials), and **for new offers of topics for students who have chosen to carry out studies in the selected specializations**. For example, in the specialization Building Materials and Building Structures, students can gain in-depth knowledge of safety and sustainability of steel, reinforced concrete and wooden structures, using methodological study materials elaborated by the teaching staff (“Design of timber structures”, “Composite structures”, “Thin-wall structures”, etc.), as well as online study materials. The experience gained in international conferences and in related experience exchange is employed by the teaching staff in elaboration of experimental programmes for master students (Influence of fibre amount on SFRC pre- and post-crack behaviour, Significance of factors affecting creep development in timber beams, Reuse of steel structural elements with bolted connections, Lightweight composite building materials with hemp additives, 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 study process is based on principles that can be achieved only through collaboration of the teaching staff - **the principle of succession**, which provides for transfer of knowledge and skills from one course to another; **the principle of deepening** of studies, which provides for transfer from a general course to an in-depth specialised course. The general courses in the Master's programme are conditionally separated in the compulsory part of the programme, which also includes courses according to the selected specialization. Such an arrangement helps students to continue targeted in-depth studies in the chosen direction. Four directions - specializations are offered in the programme with the possibility to select courses for in-depth studies (see the plan of the programme in Appendix No.3).

Observing the topicalities in the civil engineering sector, the teaching staff attract not only representatives of the sector with guest lectures, and frequently also entrust to master students of the study programme "Civil Engineering" to read lectures on any topical theme to students and teaching staff in civil engineering speciality, for example, "BIM in Latvia" in the framework of the study course "Construction Technology and Management"; to organise training tours within the framework of the course mentioned.

Concurrently with cooperation of the teaching staff at LLU, also **cooperation agreements with other universities** have been concluded in the reporting period and **visiting professors** have been invited, which, undoubtedly, has also facilitated interconnection among courses of the Master's programme, for example:

- with visiting professors of RTU Faculty of Civil Engineering, who have read lectures on specific topics (for, example, Structural Dynamics);
- with a visiting professor of Maribor University (Slovenia) – on problems of optimisation of structures;
- with a visiting professor of the Estonian University of Life Sciences – on specific topics of designing of building structures;
- with a visiting professor of Wroclaw Technical University – on problems of construction organisation.

According to the statistical data provided by LLU, the **ratio between the number of students and the teaching staff** of the professional Master's programme is 8.7 as on 01.09.2020.

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	2_appendix_BUV_MAG_statistics_ENG.pdf	2_piel_BUV_MAG_studejoso_statistika_LV.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	1_appendix_compl_with_education_standard.pdf	1_piel_atbilstiba_izgl_standartam.pdf
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	4_appendix_BUV_MAG_Study_course_mapping_ENG.pdf	4_piel_BUV_MAG_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	3_study_plan.pdf	3_studiju_plans.pdf
Descriptions of the study courses/ modules	5_appendix_BUV_MAG_Study_course_description_ENG.zip	5_piel_BUV_MAG_Studiju_kursu_apraksti_LV.zip
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	BUV_MAG_ENG.pdf	BUV_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	agreement_RTU_LL.U.rar	vienosanas_RTU_LL.U.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_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.		

Land Management and Surveying (42581)

Study field	<i>Architecture and Construction</i>
ProcedureStudyProgram.Name	<i>Land Management and Surveying</i>
Education classification code	<i>42581</i>
Type of the study programme	<i>Professional bachelor study programme</i>
Name of the study programme director	<i>Vivita</i>
Surname of the study programme director	<i>Puķīte</i>
E-mail of the study programme director	<i>vivita.pukite@llu.lv</i>
Title of the study programme director	<i>Dr.oec.</i>
Phone of the study programme director	
Goal of the study programme	<p><i>The objective of the study programme is to ensure acquisition of theoretical knowledge and working skills for land surveying and mapping, property formation, land consolidation, accounting and valuation, applying modern designing, land surveying and accounting technologies, as well as acquisition of research skills, so that the specialist who has acquired the engineer's qualification could work in the production sector and also continue Master's studies.</i></p> <p><i>Considering that land management tasks change depending on the current tasks of the national economy and the state policy regarding land, we hold a view that a graduate of the study programme should have comprehensive and extensive knowledge, so that the specialist could find a job at any time.</i></p>
Tasks of the study programme	<p><i>The tasks of the study programme are as follows:</i></p> <ul style="list-style-type: none"> <i>• to ensure professional, practice-oriented education for students, which would allow entering the labour market and carrying out scientific research work;</i> <i>• to ensure facilities for acquiring such theoretical knowledge and skills that would allow graduates to commence practical activity after completion of the study programme;</i> <i>• to ensure acquisition of modern general knowledge, develop engineering thinking, promote analytical abilities of students, improve skills in development of projects;</i> <i>• to develop general abilities to work in a team for solving professional problems and tasks;</i> <i>• to ensure for students appropriate theoretical and practical training that allows to acquire the qualification – Engineer in Land Management, and to continue studies in the Master's programme.</i>

Results of the study programme	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> • knows the type and size of the Earth, coordinate systems, types of geodetic measurements and networks, methods and accuracy, mapping methodology, the nature, content, possibilities, necessity and use of photogrammetry and remote sensing; • knows the theory and practice of land management, its essence and content, rational and effective land management, use and protection, legal aspects of spatial planning and land use planning, as well as the methodology of spatial planning and land use planning project documents development; • knows the history, essence, content, necessity and use of cadastral information, real estate value, its types, factors influencing real estate value and determination criteria, as well as is familiar with the legal aspects and methodology of property rights and cadastral valuation; • knows the knowledge necessary for the cadastral surveyors of land and buildings on the determination of the real estate object, its historical development, legal and geodetic substantiation; • knows small and medium-sized, innovative entrepreneurship, forms of business, business environment and its improvement, assessment of companies' economic activity and planning of its activities. <p><i>Skills:</i></p> <ul style="list-style-type: none"> • is able to work carefully and accurately in a team and independently, cooperate with clients, use their knowledge in practice, make decisions according to competence, analyze information and draw conclusions; • is able to draw up documents in accordance with the requirements specified in regulatory enactments in the field of record keeping and land management and surveying; • is able to work with special computer programs, compile, systematize and analyze data, use special literature relevant to the field and use professional terminology. <p><i>Competencies:</i></p> <ul style="list-style-type: none"> • can install a geodetic (surveying) support network point, perform cadastral surveying of real estate objects, geodetic and topographic research for the needs of construction, territorial planning and accounting; • is able to compile large-scale topographic plans and maps, land boundaries, encumbrances and situation plans, use geographical information systems; • can develop the graphic part of the spatial plan, land development project, knowing the rational use of land, the organization of the territory and the regulatory enactments regulating the field; • can perform cadastral valuation of real estate objects and work with the database of the Real Estate State Cadastre Information System.
Final examination upon the completion of the study programme	Diploma project in the speciality

Study programme forms

Full time studies - 4 years - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	4
Duration in month	0
Language	<i>latvian</i>
Amount (CP)	160
Admission requirements (in English)	<i>General secondary education or vocational secondary education</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Bachelor Degree in Land Management and Surveying</i>
Qualification to be obtained (in english)	<i>Engineer in Land Management</i>

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	<i>Part time extramural studies</i>
Duration in full years	5
Duration in month	0
Language	<i>latvian</i>
Amount (CP)	160
Admission requirements (in English)	<i>General secondary education or vocational secondary education</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Bachelor Degree in Land Management and Surveying</i>
Qualification to be obtained (in english)	<i>Engineer in Land Management</i>

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	<i>Full time studies</i>
Duration in full years	4
Duration in month	0
Language	<i>english</i>
Amount (CP)	160
Admission requirements (in English)	<i>General secondary education or vocational secondary education. At least B2 level of English language skills</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Bachelor Degree in Land Management and Surveying</i>
Qualification to be obtained (in english)	<i>Engineer in Land Management</i>

Places of implementation

Place name	City	Address
Latvia University of Life Sciences and Technologies	JELGAVA	LIELĀ IEĻA 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 Faculty of Environment and Civil Engineering of the LLU has accumulated many years of experience in implementing the professional higher education Bachelor's study programme "Land Management" since 1947. Implementing the results of the land reform and land management issues, the demand for land surveying, real estate cadastre, real estate valuation and other land development and land surveying works has significantly increased. The professional Bachelor's study programme "Land Management" was accredited until 25.06.2019. Since the previous accreditation, this study programme has been constantly evolving to keep pace with rapid changes in practice and to meet foreign universities of a similar profile. Therefore, in order to implement the necessary changes, a **new professional Bachelor's study program "Land Management and Surveying" was developed**, receiving License No. 04056-85 by the Study Program Licensing Commission Decision No. 46 of 10 December, 2014. After licensing the study programme, it was included in the list of accredited study programmes in the field of Architecture and Construction implemented by the LLU. The licensed programme included the following main changes in comparison with the previously implemented study programme:

- in the duration of studies - from 5 years of full-time studies to 4 years of full-time studies and 5 years of part-time studies.
- in the study plan - the theoretical basic courses of the field and the professional specialization courses of the field to comply with the standard of the profession and the requirements of the labour market,
- in the title of the study programme - from "Land management" to "Land Management and Surveying" promoting the recognition of the study programme and on the basis of normative documents that regulate certification, as well as the demand for specialists in the labour market.

The development of the professional Bachelor's study programme "Land Management and Surveying" has taken place in cooperation with employers and colleagues of foreign universities, observing the requirements of the Law on Higher Education Institutions and the Law on Vocational Education, which ensures the acquisition of the fifth level professional qualification.

After receiving the license, students were admitted to the study programme "Land Management and Surveying" starting from the 2015/2016 academic year, at the same time, terminating the admission to the study programme "Land Management". At the end of the 2018/2019 academic year, the study programme "Land Management" was closed.

The awarded degree in the study programme "Land Management and Surveying" is specified from "Professional Bachelor Degree of Engineering in Land Management and Surveying" to **"Professional Bachelor Degree in Land Management and Surveying"** according to the Cabinet Regulations No. 512. The implementation form of the study programme is specified to **"Part time extramural studies"**, because the implementation form "Part time intramural studies

" indicated in the existing accreditation sheet of the study direction has never been implemented by LLU in this study program. Both are technical mistakes in the accreditation sheet and have not been corrected during the reporting period.

In recent years, the study programme has undergone significant work (improved English language skills of the lecturers, working with ERASMUS+ foreign students on mobility, prepared study materials, purchased study literature in English, developed study environment) to **further implement the programme 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.

After receiving the license on 10 December, 2014, the students in the study programme were admitted from the 2015/2016 academic year.

Data on the dynamics of the number of students, the dynamics of the number of graduates, student dropout and its reasons, as well as the distribution of the number of students by funding sources are summarized in the *Appendix No.1 "Statistical data on students in the professional Bachelor's study programme "Land Management and Surveying"*.

Analyzing the total number of students in the study programme, it should be noted that in the period from the academic year of 2015/2016 to the academic year of 2020/2021, there is a **total increase in the number of students**, which currently makes up the number of students in the study programme - 83 students, including 62 students in full-time studies and 21 students in part-time studies.

Analyzing the statistics of **the enrolled students** (*Fig.1*), it can be observed that in the 2017/2018 academic year the number of enrolled students was the highest - 37, but the lowest number of enrolled students was in the 2019/2020 academic year - 17. There were no part-time studies in 2016/2017 and in 2019/2020, because the minimum number of students was not met - 5 students, however, it should be noted that part-time studies are of interest every year, several former students who have stopped studies for some reason are interested in resuming studies specifically in part-time study form, in a higher study course after equating previously acquired study courses.

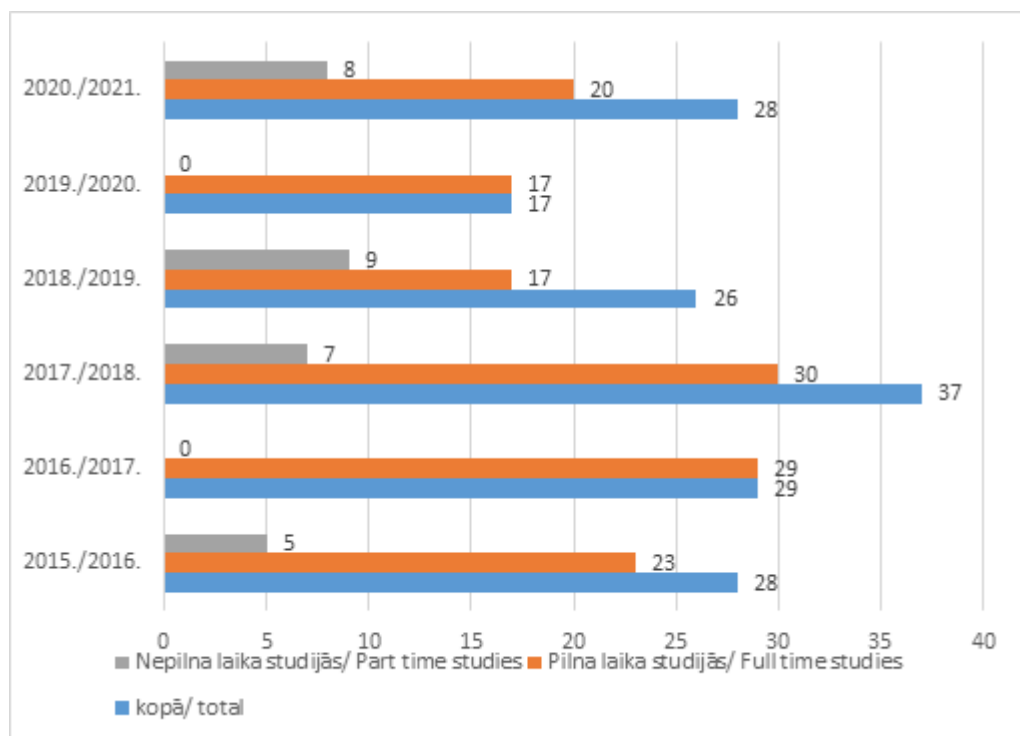


Fig.1 Distribution of enrolled students by academic year

Evaluating the total **dropout of students** by academic years in the study programme (Fig.2), it can be concluded that it makes up on average 22.6% of the total number of students in the study programme in the specific academic year. In recent academic years, the number of students has stabilized and the drop-out rate has decreased.

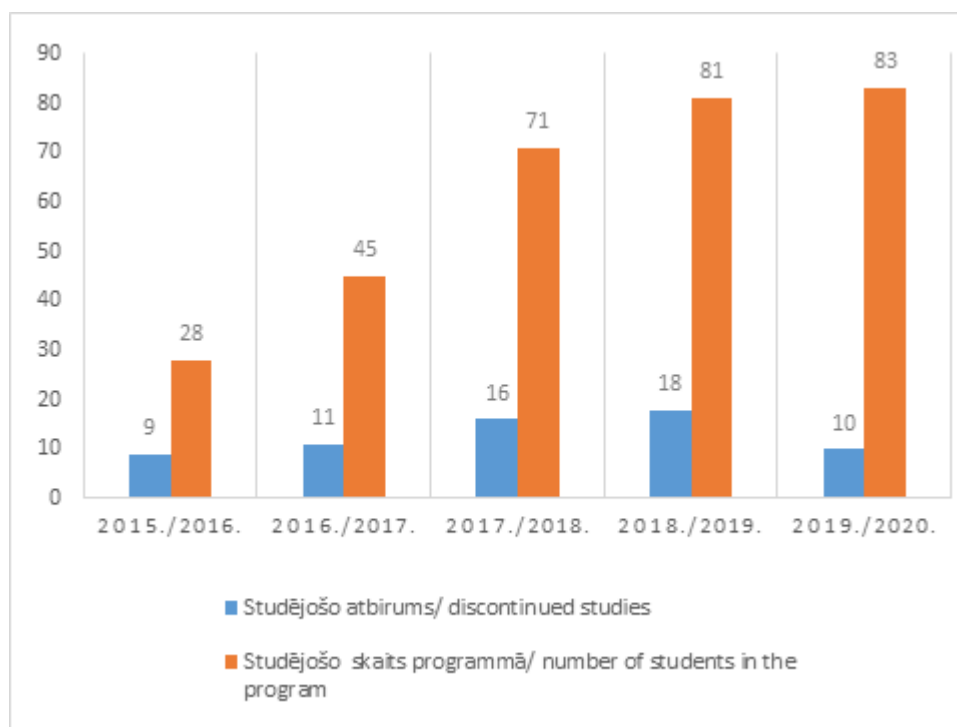


Fig.2 Distribution of student dropout in relation to the total number of students by academic years

When analyzing student dropout, several causal factors should be noted. One of the factors is that after entering the study programme, the students do not start studies, there are 7 such cases found in the reporting period. In the majority of cases, the factors for termination of studies are related to non-fulfillment of study contract obligations, non-fulfillment of financial obligations, non-fulfillment of study programme requirements, failure to complete final examinations, non-registration for

studies for the next academic year, non-return from academic leave, etc.

Also, the changes in the number of students can be explained by demographic indicators and the decrease in the total number of students in the country, as well as the lack of interest in engineering studies by those who have acquired secondary education.

Analyzing the **number of students in the study programme by types of financing**, i.e. state budget study places and paid study places, it must be concluded that the number of students in the study programme in state budget study places exceeds the number of paid students. In the academic year of 2017/2018, there were 4 students studying in a paid study place in the full-time study programme, in 2018/2019 it was 5 students, in 2019-2020 - 18 students and in 2020/2021 - 3 students. According to the results of each semester, students who study for a fee have the right to participate in the budget place rotation competition and in case of a positive result - get a budget place in the next semester, which is shown by the decrease in the number of paid students in 2020/2021 academic year. It should be noted that all part-time students study for a fee.

In the study programme, all full-time and part-time students study in Latvian, separate study courses within the Erasmus+ program are taught to foreign students in English. At the moment of submitting documents for accreditation, the study programme has been prepared in accordance with all the requirements for organizing the study process in the study programme in English. This will increase the number of students in the programme, as well as promote the international recognition of the programme.

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 complies with the Cabinet Regulations of 26 August 2014 No. 512 "Regulations on the State Second Level Professional Higher Education Standard", as evidenced by the *Appendix No.2 "Compliance of the professional Bachelor's study programme "Land Management and Surveying" with the state education standard"* which analyzes the compliance of the programme indicators with the requirements set out in the education standard. The analysis shows that the volume of the study programme is 160 CP, which corresponds to the volume of the professional Bachelor's programme, as well as the volume of the study programme parts, incl. the scope of the final work, is appropriate, as **the study programme consists** of:

1. *General Study Courses 20CP*
2. *Theoretical Basic Courses 36CP*
3. *Professional Specialization Courses 60CP*
4. *Elective Courses 6CP*
5. *Practices 26CP*
6. *State Examinations 12CP*

The content of the study programme **corresponds to the current version of the professional standard of the land management engineer**, which was agreed at the meeting of the Tripartite Cooperation Sub-Council of Vocational Education and Employment on August 20, 2008, protocol No.6 (<https://registri.visc.gov.lv/profizglitiba/documents/standards/ps0429.pdf> (in Latvian)). The compliance is evidenced by the *Appendix No.3 "Compliance of the professional Bachelor's study*

programme “Land Management and Surveying” with the professional standard”, which describes the acquisition of the knowledge required to complete the key tasks of the professional activity of a land management engineer in the relevant study courses of the study programme, as specified in the professional standard.

The Department of Land Management and Geodesy of the LLU has close cooperation with professional organizations in the field - the Latvian Surveyors' Association and the Latvian Association of Cartographers and Geodesists. **The aim of the study programme**, which is to ensure the acquisition of theoretical knowledge and work skills for land surveying and mapping, property formation, land consolidation, accounting and valuation, using modern design, land surveying and accounting technologies, as well as research skills, so that the specialist who has acquired the qualification of an engineer could work in production, as well as continue their Master's studies, is in line with the rules set by these professional organizations for the common requirements of the profession also in Europe and in the world.

Given that the tasks of land management and land surveying change depending on the current economic tasks, we believe that the graduate of the study programme must have comprehensive, extensive knowledge in order for a specialist to find a job at any time. Therefore, the study programme is aimed at training specialists in the field of land management and land surveying with extensive competencies in engineering, economic and legal issues for work in industry companies, local governments and public administration institutions. Thus, **the tasks of the study programme** are as follows:

- to provide students with professional, practice-oriented education that enables them to enter the labour market, as well as to carry out scientific research work;
- to provide opportunities for the acquisition of such theoretical knowledge and skills that would allow graduates to start practical activity after the acquisition of the study programme;
- to ensure the acquisition of modern general knowledge, to develop engineering thinking, to promote students' analytical abilities, to develop skills in project development;
- to develop general abilities to work in a team in solving professional problems and tasks;
- to provide students with appropriate theoretical and practical training, which gives the opportunity to obtain a qualification of a land management engineer, as well as to continue education in Master's programme.

It should be noted that **the study programme “Land Management and Surveying” is unique in Latvia with almost 75 years of history**, also in the European Union there are only a small number of similar study programmes, thus proving that the competitiveness of graduates in the labour market is very high. This is also confirmed by the fact that the students of the study programme of the last 11 years have already found stable jobs in the field at the moment of graduating from the study programme.

The study programme performance indicators are characterized by the **proposed study results**, which substantiate the knowledge, skills and competence requirements of the field included in the standard of the profession of a land management engineer, and they are as follows:

Knowledge:

- knows the type and size of the Earth, coordinate systems, types of geodetic measurements and networks, methods and accuracy, mapping methodology, the nature, content, possibilities, necessity and use of photogrammetry and remote sensing;
- knows the theory and practice of land management, its essence and content, rational and effective land management, use and protection, legal aspects of spatial planning and land use planning, as well as the methodology of spatial planning and land use planning project

documents development;

- knows the history, essence, content, necessity and use of cadastral information, real estate value, its types, factors influencing real estate value and determination criteria, as well as is familiar with the legal aspects and methodology of property rights and cadastral valuation;
- knows the knowledge necessary for the cadastral surveyors of land and buildings on the determination of the real estate object, its historical development, legal and geodetic substantiation;
- knows small and medium-sized, innovative entrepreneurship, forms of business, business environment and its improvement, assessment of companies' economic activity and planning of its activities.

Skills:

- is able to work carefully and accurately in a team and independently, cooperate with clients, use their knowledge in practice, make decisions according to competence, analyze information and draw conclusions;
- is able to draw up documents in accordance with the requirements specified in regulatory enactments in the field of record keeping and land management and surveying;
- is able to work with special computer programs, compile, systematize and analyze data, use special literature relevant to the field and use professional terminology.

Competences:

- can install a geodetic (surveying) support network point, perform cadastral surveying of real estate objects, geodetic and topographic research for the needs of construction, territorial planning and accounting;
- is able to compile large-scale topographic plans and maps, land boundaries, encumbrances and situation plans, use geographical information systems;
- can develop the graphic part of the spatial plan, land development project, knowing the rational use of land, the organization of the territory and the regulatory enactments regulating the field;
- can perform cadastral valuation of real estate objects and work with the database of the Real Estate State Cadastre Information System.

Admission requirements in the study programme are determined in accordance with the requirements of students in engineering studies, thus they are appropriately linked to the study results of the study programme, as well as suitable for applicants depending on the time of the acquisition of secondary education, they are:

For persons who have acquired secondary education from 2004:

- mandatory centralised exam in Latvian;
- mandatory centralised exam in a foreign language. Foreign language CE grade may be substituted by the assessment of the international test according to the CM Regulations No.543 of 29.09.2015;
- mandatory centralised exam in Mathematics;
- additional points for a centralised exam in Physics.

For persons who have acquired secondary education before 2004 or have been released from CE:

- mandatory year grade in the Certificate/Diploma or centralised exam in Latvian;
- mandatory year grade in the Certificate/Diploma or centralised exam in a foreign language;
- mandatory year grade in the Certificate/Diploma or centralised exam in Mathematics;
- additional points for the year grade in the Certificate/Diploma in Physics.

The Professional Bachelor's degree in Land Management and Surveying and professional qualification Engineer in Land Management shall be awarded after passing the theoretical study courses, completing the internship tasks and defending the thesis project before the State Examination Commission.

The multidisciplinary approach used in the implementation of the study programme allows students to practically apply the knowledge acquired in the theoretical part in solving the current problems of companies and institutions in the field, which allows students to integrate into the labour market as much as possible. The implementation of the study programme is focused on the application of innovative technologies for economic development.

In general, the analysis proves that the title of the study programme, the degree to be obtained, the professional qualification, the aims and tasks of the study programme, as well as the study results to be achieved and the admission requirements are coordinated and appropriate.

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 volume of the study programme is 160 CP, it consists of study courses in the amount of 122 CP, internship - 26 CP and State examination - 12 CP (*the plan of the study programme is available in the Appendix No.4*). The choice of study courses of the study programme, the volume and content of the study courses, as well as the content of internships are developed in accordance with the Professional Bachelor Degree of Engineering in Land Management and Surveying and the qualification of a Land Management Engineer in accordance with the professional requirements set for a land management engineer by the professional standard. **Descriptions of study course plans** (*Appendix No.5*) are prepared in all languages in which the study programme is implemented and they comply with the requirements specified in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Higher Education Institutions.

After licensing the study programme, **the content of the study courses is regularly improved, supplementing them in accordance with the current events in the field, new technologies, alternative applications of equipment, and the latest informative materials and literature.** It should be noted, that the topics of the study courses are updated also after the improvement of lecturers' knowledge in industry exhibitions, seminars and conferences. For example, prior to the Covid-19 pandemic, several faculty members regularly attended the annual international exhibition INTERGEO (Germany) in the field of land management planning, spatial planning and surveying, participating in seminars and discussions with industry representatives from various countries. Thus, bringing within the study courses, global news and

scientific trends in the labour market, as well as the experience gained, which has been applied in the purchase of new geodetic instruments and equipment to supplement the technical base for student training.

The Department of Land Management and Geodesy, as the implementer of the study programme, has established **close cooperation with the representatives of the labour market of the industry**. Therefore, it should be noted that employers and representatives of the industry are regular guests, giving **guest lectures on current events in the industry**, within the framework of various study courses.

For example, in the *2015/2016 academic year*, two representatives of SIA Latvijasmernieks.lv gave guest lectures within the study course "Introduction to the specialty" - Role of a surveyor in the national economy and Work organization, planning and management of SIA Latvijasmernieks.lv; three employees of the State Land Service gave lectures within the study courses "Real Estate Cadastre", "Cadastral Survey of Buildings" - News in the work of the State Land Service, organization of data exchange of the State Land Service with other information systems, Organization, planning and control in the cadastral surveying of buildings; within the study course "Organization of Land Management and Surveying Works" one guest lecture was given from the State Land Service - General organization of works, planning and control in the State Land Service, one lecture was given by the Rural Support Service - Organization of works, planning and control in the Rural Support Service.

In the 2016/2017 academic year, one guest lecture was given on the topic of geodetic networks within the study course "Geodesy II" by the Jelgava City Construction Board, SIA Binders, SIA Delta Kompānija, a guest lecturer from SIA GeoStar spoke on the topic of global positioning; within the study course "Land Law I" one lecture was given by the representative of Ministry of Environmental Protection and Regional Development of the Republic of Latvia - Establishment and liquidation of easements, on providing access opportunities; within the study course "Real Estate Cadastre" one guest lecture was given from the State Land Service - What data can we obtain from the SLS databases ourselves and how to do it; within the study course "Land Management II" on land use issues one guest lecture was given from SIA ZZDats - "Unified Local Government System (GSP) developed by SIA" ZZDats - invaluable support in the work of local governments in land management".

In the 2017/2018 academic year in the framework of the course "Geodesy I", one guest lecture on geodesic instruments was given by SIA GeoStar, in the framework of the course "Geodesy II", a lecture on geodesic networks was given by SIA Binders, one guest lecture was given by SIA Delta kompānija, one by the Jelgava City; in the framework of the course "Spatial Planning I", one guest lecture was given by the Jelgava Municipal Council and one by the Bauska Municipal Council.

In the 2018/2019 academic year, guest lectures from SIA Binders, SIA Delta Kompānija, SIA VINOKO were given during the study course "Engineering Geodesy and Topographic Surveying I": within the study course "Geodesy II" one guest lecture on the topic of geodetic networks was given from Jelgava City Construction Board; a guest lecture from SIA Latvijasmernieks.lv was given within the study course "Land Management Design I".

In the 2019/2020 academic year, two guest lectures from SIA GPS Partners, one guest lecture from SIA GeoStar were given on the issues of global positioning within the study course "Geodesy II";

Within the study course "Organization of Land Management and Surveying Works", guest lectures were given from the State Land Service, LMB Certification Centre, Latvian Association of Cartographers and Geodesists.

In the analysed period from 2015/2016 academic year until 2019/2020 academic year, until the

occurrence of the Covid-19 pandemic, **study tours** were organized for students within several study courses **in cooperation with industry specialists and employers, improving students' understanding of the requirements of the labour market within the study courses**. For example, study tours were organized:

- to Engure region within the study course “Land Management II”;
- to the farm “Bērzkalni” within the study course “Farm Territory Design”;
- to St. Peter's Church in Riga, where one (of two) starting points or zero points of the Riga geodetic network is located (the other is located on the roof of the University of Latvia building), these points used to be a reference point for measuring the territory of Latvia, study course; tour organized in the framework of the study course “Geodesy II”;
- to the Satellite Observation Station of the Institute of Astronomy of the University of Latvia, which is located in the territory of the Botanical Garden of the University of Latvia, within the study course “Geodesy II”;
- to the Ventspils Radio Astronomy Centre, in the territory of which the point G0 of the Latvian geodetic support system is located, within the study courses “Geodesy I” and “Geodesy II”;
- to Jēkabpils City Council, Rēzekne City Council within the study course “Land Management I and II”, “Spatial Planning I and II”;
- to SIA “GeoStar”, which represents the geodetic equipment and software company TRIMBLE in Latvia, where the students got acquainted with the calibration system of geodetic instruments within the study course “Geodesy II”;
- etc.

In the academic year of 2019/2020, **in cooperation with specialists and employers in the field, the study plan was improved**, as a result of which several study courses with a smaller volume were combined into one. For example, at the suggestion of industry experts, the study courses “Geodesy”, “Geodesic Tools”, “Physics” and “Mathematics” were combined in the study course “Geodesy I”, thus encouraging students’ understanding of the connection between physics and mathematics and the understanding of the theoretical basic courses of the studies; the study course “Computer Graphics in Land Management and Surveying” was supplemented with the application of coding software, thus, improving the students’ competencies in processing of surveying data, the study course “Land Management I” combined the study courses “Basic Land Management” and “Land Policy”, promoting the students’ awareness of land management issues in the European Union and Latvia etc.

It should be noted that after graduating from the study programme, having worked in the field for two years, the graduate has the right to be certified in accordance with the procedures specified in regulatory enactments in the following areas:

- In the field of land management;
- In the field of land cadastral surveying;
- In the field of geodesy.

Thus, the **study courses implemented in the study programme provide not only theoretical knowledge, but also form a connection with the requirements of the labour market** through study and professional practices. For example, the study programme includes professional internships “Land Cadastral Surveying”, “Real Estate Management”, which are carried out in industry companies, involving students in real work processes in land cadastral surveying and development of land management projects, while internships “Engineering Geodesy” and “Topographic Surveying” are led by lecturers who are leading employees in the industry with more than 5 years of experience, thus providing an understanding of the requirements for the performance of geodetic work in the industry.

Representatives of employers regularly participate in the review of thesis projects and in the State Examination Commission in order to be able to provide an assessment of the knowledge acquired by students in the study programme. By participating in the work of the state examination commission, the representatives of the industry are able to express their proposals on the topics of thesis projects that are relevant in the labour market, on recommendations for the improvement of students' knowledge, skills and competencies. Recommendations are taken into account in the next study years, when students choose the topics of their thesis projects, as well as when preparing students for better quality defence of thesis projects before the State Examination Commission.

Based on the analysis, it can be concluded that the descriptions of the study courses, internships and final theses are developed in good quality and in accordance with the requirements of regulatory enactments, as well as their content is relevant and corresponds to the needs of the industry, labour market and scientific trends.

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 programme is implemented by lectures, practical and laboratory classes, trips to companies in the field, as well as in independent studies, learning the basics of land management and land surveying and regularities with other sectors of the economy.

All study courses included in the study programme are related to the goals and tasks of the study programme, as well as the results to be achieved. Upon completion of the study courses, students must acquire knowledge, skills and competencies, which are determined by the standard of the land management profession.

Analysing **the connection of the aim of the study programme and the achievable results with the information included in the study courses**, achievable results, set aims and other indicators, and their compliance with the Cabinet of Ministers of the Republic of Latvia Regulations of 26 August 2014 No. 512 "Regulations on the Second Level Professional Higher Education State Standard" and the requirements specified in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Higher Education Institutions, it may be concluded that:

- the aim of the study programme is developed in such a way as to ensure professional studies corresponding to the needs of the national economy, national defence and security needs, as well as social needs, based on the theoretical foundations of the discipline, corresponding to the standards of the profession of a land management engineer and applicable in practice;
- the content of the study programme provides a set of knowledge, skills and competences in accordance with the LQF Level 5 knowledge, skills and competences, which are in accordance with the EQF Level 6, as well as would promote students' competitiveness in changing socio-economic conditions and the international labour market.

The tasks of the study programme are as follows:

- to provide students with professional, practice-oriented education that enables them to enter

the labour market, as well as to carry out scientific research work;

- to provide opportunities for the acquisition of such theoretical knowledge and skills that would allow graduates to start practical activity after the acquisition of the study programme;
- to ensure the acquisition of modern general knowledge, to develop engineering thinking, to promote students' analytical abilities, to develop skills in project development;
- to develop general abilities to work in a team in solving professional problems and tasks;
- to provide students with appropriate theoretical and practical training, which gives the opportunity to obtain a qualification of a land management engineer, as well as to continue education in Master's programme.

The volume of the study programme and its structural distribution (*Table 1*) is in accordance with the state education standard. The main parts of the study programme are study courses, internships, state examination, a part of which is the development and defense of a diploma thesis. In order to ensure the achievement of the goal and tasks set for the study programme, in the first and second study years, general education study courses and basic theoretical courses of the field are mainly acquired, which form the basis for acquiring special knowledge and practical skills during further studies.

Table 1

The structure of the study programme and its proportions

No.	Part of the study programme	Volume	% of total
1.	General education study courses	20	12
2.	Theoretical branch-specific basic courses	36	22
3.	Branch professional specialization courses	60	38
4.	Free choice courses	6	4
5.	Internship	26	16
6.	State examinations	12	8
	Total:	160 CP	100

The content and scope of examinations correspond to the content and professional qualification requirements specified in the study course programmes. All conditions for obtaining credit points are described in the programme description of each study course.

In order to analyse the correspondence of the study results to the study programme results and explain their connection, **a mapping of study courses of the programme** was developed, which is provided in the *Appendix No.6 "Professional higher education Bachelor's study programme "Land Management and Surveying" study course mapping"*. The mapping analyses the interaction of the goals and achievable results provided in the descriptions of descriptions of all study course programmes of the study programme with the professional standard and the goals and achievable

results of the study programme. The analysis allowed to emphasize the gaps in the descriptions of study course programmes that need to be improved.

Based on the analysis, it can be concluded that the information included in the study courses, the results to be achieved, the set goals and other indicators, as well as the study course goals are linked to the study programme goals and results and meet the requirements of the regulations of the Republic of Latvia and industry requirements.

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 study programme as implemented in full time intramural studies and part time extramural studies, observing the requirements specified in the regulatory enactments. Basic principles of study organization determined by the LLU. The study course programmes define a set of relevant knowledge, skills and competencies and their evaluation system, define study results, for the achievement of which credit points are awarded, which do not depend on whether the studies are implemented as full-time or part-time studies. A summary grading system is used to evaluate student performance, where the final grade is formed from several components.

The full-time studies of the study programme corresponds to 40 CP per academic year and the amount of work of the student's academic hours in one academic week makes up 1 CP. In order to fulfill the requirements specified in the study programme and in each study course of the full-time studies, a longer study programme acquisition time and a smaller number of credit points to be acquired in part-time studies is set - 32 CP per academic year. Thus, when implementing study programmes in different ways, the study courses differ only in the number of contact hours and independent work hours, as well as the didactic approach to the study course training.

The didactic concept of the study programme is based on the use of the latest and most advanced teaching methods. It envisages the development of the study content and the organization of studies, which ensures the **sequential and in-depth acquisition of the knowledge provided in the study programme and is focused on solving real examples and problems.** For example, the cases considered in the study courses "Land Law II", "Land Boundary Law" and "Land Cadastral Survey" and presented for problem solving are based on in-depth research of theoretical and practical issues in the field of land use and land surveying.

Teaching methods such as lectures using PowerPoint or other presentations, seminars, group work, situation analysis, study tours to companies and institutions in the field are used to strengthen theoretical knowledge in the practical work environment. The pedagogical methods and evaluation methods of the study course implementation are chosen by the teaching staff of the corresponding study courses in accordance with the specifics of the study programme and the study course.

In the study process, great emphasis is placed on **students' independent work, using both problem-based learning and situation analysis and the advisory role of the lecturer.** For example, in the study courses "Land Management II", "Spatial planning III", "Land Survey Design II", "Entrepreneurship", "Engineering Geodesy and Topographic Surveying", "Organization of Land

Surveying and Surveying Works” etc., using the metacognitive principles, students plan their activities depending on their own learning goals and independently manage their own learning process, at the same time analysing and evaluating what they have acquired in the study course and in the study process in general.

In the implementation of the study programme, the **LLU e-learning environment** is used, which is created on the Moodle platform, which is regularly used by the students, lecturers and guest lecturers of the study programme. Current study courses are available in it, where the respective lecturer has posted materials for the lectures, seminars, practical and laboratory works, literature and other materials of the study course programmes. In the e-learning environment, the lecturers post various tests and tasks, create tests. In the spring of 2020, the Covid-19 pandemic also affected the implementation of the study process at LLU, which required additional resources and work to reorganize studies for remote training. It was necessary to review the study materials, especially the practical works, so that they could be implemented remotely or individually. New learning approaches were implemented. One of them was the e-learning environment, where in the BBB environment the lecturers still give lectures, conduct practical and laboratory works, consult students, also the industry representatives give guest lectures within the study courses in this environment.

The principles of **student-centered education** are taken into account in the implementation of the study process of the study programme:

1. Involvement of students in the study process and content improvement.

The LLU has developed methods that provide students with feedback on the quality of the study process. For example, there are regular meetings of the study programme director and course seniors, study programme director and student meetings, as well as student questionnaires. Thus, the students have the opportunity to influence the study process. Students in the study programme are regularly involved in the evaluation of the quality of the study programme, senior students have participated in the study programme improvement process.

2. Study results.

The evaluations of the study courses of the study programme and the amount of credit points are related to the study results. Students are informed about the study results of the study programme at the beginning of their studies in the study course “Introduction to the Specialty”. Students are informed about the study results in a specific study course by the relevant lecturer of the study course, who links the results of the study course with the results of the study programme, as well as substantiates the need to acquire the course to learn the profession of a land management engineer. The basic forms of evaluation of the study programme acquisition are an exam and a test with a mark, which must be passed at the end of the study course. The form of the examination is specified in the study programme plan. Assessment of study results takes place in accordance with the Study Regulations of the LLU and the Regulations of the Final Examinations of the LLU.

3. Mobility.

In the study programme, the mobility resources are used to improve the pedagogical process, because the student-centered education approach is based on a strong pedagogical process. Lecturers of foreign universities are involved in the implementation of the study programme. For example, guest lectures within the study course “Geodesy II” on global positioning and geodetic networks were given by foreign lecturers from Klaipeda University of Applied Sciences (Lithuania) and Aleksandras Stulginskis University (Lithuania), guest lectures within the study courses “Land Management I” and “Land Management II” on land management were given by foreign lecturers from Wrocław University of Environmental and Life Sciences (Poland), Kazakhstan State Agrarian

University and Kaunas University of Forest and Environmental Engineering (Lithuania). Guest lectures within the study courses “Spatial Planning I”, Spatial Planning II” and “Land Use Planning I” on the topic of spatial organization and planning were given by foreign lecturers from the Estonian University of Life Sciences, Vytautas Magnus University (Lithuania), Warmia and Mazury University in Olsztyn (Poland), and the University of Pitesti (Romania). Thus, not only students can learn, but also the teaching staff involved in the implementation of the study programme can learn by taking over the good practice of the teaching staff of foreign universities in pedagogy.

4. Social dimension.

The study process is flexible enough to allow students to combine the studies with work in the industry and family life. This is substantiated by the results of a student survey, which indicates that 90% of students work during their studies, incl. 76% - in the industry.

5. Learning and teaching methods.

Various teaching and learning methods are used in the implementation of the study programme. For example, guest lectures and study tours are organized. In some study courses term papers and course projects are developed. Some study courses use the group work in the practical work and laboratory work, thus allowing students to understand the importance of the contribution of each member of the group in achieving the overall result, which is an important aspect of the profession of a land management engineer. Students also have the opportunity to receive individual consultations from lecturers through e-mail, Whatsapp and, especially during the Covid-19 pandemic, the BBB e-learning environment. During the implementation of the study programme, there is a regular cooperation between the LLU Fundamental Library and the teaching staff with the aim to improve the teaching and learning process.

6. Learning environment.

The teaching staff and students involved in the study programme are provided with access to the learning process in suitable premises with appropriate equipment. Students are also introduced to the resources and databases available in the LLU library.

7. Competence building of the teaching staff.

The teaching staff involved in the implementation of the study programme are provided with regular opportunities for the improvement of their methodological and didactic skills. Courses and seminars on the latest teaching and pedagogical methods are organized for the teaching staff, as well as attendance of qualification courses is encouraged. For example, several faculty members involved in the study programme developed their competencies in creating dynamic and active presentations, using MS cloud services for data storage and sharing, and using online tools for creating and communicating an interactive presentation and creation of online surveys within the project No. 8.2.2.0/18/A/014 “Improvement of the LLU Teaching Staff”. LLU also organizes professional development events for lecturers at the university level, offering to acquire the modules of the professional development program in the Higher Education Teachers' Professional Development Programme “Innovations in Higher Education Didactics”. It is also possible for lecturers to develop competencies at the international level. For example, by participating in Erasmus+, Nord+ and BOVA mobility, lecturers use the acquired competencies to implement their study courses, which are especially useful in the conditions of the Covid-19 pandemic.

8. Extracurricular activities for students.

Every student in the study programme is offered opportunities to get involved in extracurricular activities (dance groups, choirs, sports sections, etc.). The director of the study programme and the teaching staff support the activities of the students' self-government and encourage the students to

get involved in it, thus improving the students' independence, implementation of ideas, as well as opportunities to study outside the lectures. It should be noted that students in the study programme are also involved in scientific work and research on current topics in the field. Students report on the results of their research at international student scientific conferences and local student scientific conferences. For example, LLU annually organizes an international student scientific conference "Students on their Way to Science", which summarizes students' research in thesis collections, as well as specifically for the students of the study programme, LLU organizes a student scientific conference "Student on their Way to Science" in two rounds, at the end of the conference a collection of students' scientific articles is published. In general, all this indicates an active extracurricular life and extracurricular opportunities for students.

In order to ensure the achievement of results in the study process, **students are introduced to the aim of the study programme, its tasks, results to be achieved and assessment rules at the beginning of studies at the beginning of the 1st year, as well as at the beginning of each study course.** Thus, students know in due time the evaluation criteria of the examinations, tests, term papers, course projects, internships and other tests and the total distribution of the total assessment, as indicated in the description of the study course programme.

The study programme includes the following **basic principles of academic assessment** - the principle of summing up positive achievements, the principle of compulsory examination, the principle of openness and clarity of assessment criteria, the principle of diversity of assessment forms and the principle of accessibility of tests. In the description of the study course programme, assessment conditions are based on these principles, which promote the achievement of the study course results and the study programme goals.

It must be concluded, that in comparison with previous study years the students' attitude towards studies has improved, thus the study results have increased, one of the reasons for this is the result of improving the work style of the teaching staff, as well as the use of innovative approaches included in the study courses.

The methods of study implementation, including assessment, contribute to the achievement of the goals and results of the study course and the programme, the principles of student-centered teaching and learning are taken into account.

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.

LLU internships are implemented in accordance with Cabinet Regulation of 26 August 2014 No. 512 "Regulations on the State Second Level Professional Higher Education Standard" and the LLU Internship Regulations (https://www.llu.lv/sites/default/files/2018-10/Prakshu_nolikums_ar_2014_2018_1.pdf (in Latvian), LLU Internship Regulations in English are available in the *Appendix No. 7*), as well as other internal normative documents of LLU.

The aim of the internship is to give students the opportunity to strengthen their theoretical knowledge, to acquire the competence corresponding to the study

programme, as well as to give the student the opportunity to **obtain the information necessary for the development of the diploma project**. The total amount of CP awarded for the internship in the study programme is 26 CP (*Table 2*), including 9 CP for practical training and 17 CP for professional internships.

Table 2

Internships provided for in the study programme

				<i>Implementation time</i>	
<i>No.</i>	<i>Internship title</i>	<i>Type of internship</i>	<i>Scope of internship</i>	<i>Full-time studies</i>	<i>Part-time studies</i>
1.	Geology and Soil Science	Practical training	1CP	2.sem.	4.sem.
2.	Geodesy	Practical training	2CP	2.sem	2.sem.
3.	Geodetic Networks	Practical training	2CP	4.sem.	4.sem.
4.	Land Cadastral Surveying	Professional internship	2CP	6.sem	8.sem.
5.	Real Property Management	Professional internship	3CP	6.sem.	8.sem.
6.	Topographic Surveying	Practical training	2CP	5.sem.	7.sem.
7.	Engineering Geodesy	Practical training	2CP	5.sem.	7.sem.
8.	Land Management and Surveying	Professional internship	12CP	7.sem	9.sem

The content of internships, in accordance with the basic requirements and specific requirements of the acquired professional qualification, which are necessary for the performance of duties and main tasks in the profession of a land management engineer, is determined by the standards of land management engineering profession and the developed internship programmes.

Internship programmes are developed for each practical training and for each professional internship included in the study programme. Analysing the results, it can be concluded that the tasks set out in the study and professional internship programmes for achieving the results are determined in order to achieve the study results to be achieved in the study programme. It is substantiated by the study programme mapping provided in *the Appendix No.6*. For example, the main task of study and professional internship is to ensure the strengthening of the relevant knowledge acquired in the study results of the study programme by improving skills, to acquire the appropriate competencies necessary for the performance of the duties of the land management engineer.

The practical training takes place within the specific study course. Thus, for example, the

practical training in “Geodesy” and “Geodetic Networks” takes place within the study courses “Geodesy I” and “Geodesy II”, the practical training in “Topographic Surveying” and “Engineering Geodesy” takes place within the study course “Engineering Geodesy and Topographic Surveying I”, the practical training in “Geology and Soil Science”, accordingly, takes place within the study course “Geology and Soil Science”.

Students are assigned to the practical training by the order of the Dean of the Faculty, and the student performs the tasks specified in the practical training programme under the direct supervision of the lecturer. Before the practical training takes place, the students are given labour safety instructions for which they sign in the Labour Safety Logbook. The instruction is given by the person in charge of labour protection and fire safety of the relevant department / institute.

Professional internship is implemented in accordance with the internship agreement, which LLU concludes with the internship provider and the student. Professional internships are organized within the study programme for the students to understand the application of theoretical knowledge in practice. For example, professional internship in “Land Cadastral Survey” takes place within the study course “Land Cadastral Survey”, professional internship “Real Property Management” takes place within the courses “Land Management II”, “Cadastre of real Property”, “Real Estate Appraisal I, II”, “Spatial Planning I, II”, and “Land Use Planning I”. In turn, the professional internship “Land Management and Surveying” covers the framework of all theoretical basic courses and professional specialization courses included in the study programme, and its aim is to enable the student to obtain the information necessary for the development of the diploma project. During the internship, the student prepares an internship report, which is submitted to the internship supervisor after the end of the internship, together with the reference of the internship provider. The student defends the internship report within the deadlines specified in the semester plan before the internship defense commission established by the Department of Land Management and Geodesy.

The Department of Land Management and Geodesy of the LLU has established very close co-operation with public organizations in the field - the Latvian Surveyors' Association and the Latvian Association of Cartographers and Surveyors, as well as with several Latvian municipalities, state institutions, surveying and real estate companies. Graduates of the study programme work in several of them, at their suggestion, internships are also offered to students.

For example, **internships were provided by the following organizations:**

in 2017/2018 academic year - Jaunpiebalga Municipality Council, Latvian Geospatial Information Agency, regional divisions of the State Land Service of the Republic of Latvia, SIA A-GEO, SIA Metrum, SIA Geodesy Centre, SIA GeoProf, SIA RIO M, SIA TERRA TOPO;

in 2018/2019 academic year - Gulbene Municipality Council, Tērvete Municipality Council, Riga city Construction Board, SIA Rīgas mērnīeks, SIA A-GEO, SIA IGATE, SIA GeoProf, SIA Geosija, SIA Ģeodēzijas centrs, SIA Ģeometrs, SIA Latvijas mērnīeks.lv, SIA Metrum;

in 2019/2020 academic year - Ikšķile Municipality, Preiļi Municipality Council, Rauna Municipality Council, Riga City Council City Development Department, Latvian Geospatial Information Agency, regional divisions of the State Land Service of the Republic of Latvia, VAS Latvijas Valsts ceļi, SIA Topoplāns, SIA InfoEra Latvia, SIA Interbaltija, SIA Latīpašums - mērnīecības birojs, SIA Melioprojekts, SIA Metrum, SIA Vidzemes mērnīeks, SIA Vinoko, SIA Geosija, SIA GEO DEVELOPMENT, SIA A-GEO;

in 2020/2021 academic year - State Land Service of the Republic of Latvia, Riga City Construction Board, SIA A-GEO, SIA Binders, SIA Latīpašums - mērnīecības birojs, SIA Metrum, SIA Novadmērnīeks, SIA Preime, SIA Vinoko.

In general, it can be concluded that the links between the study and professional internship tasks included in the study programme and the study results to be achieved in the study programme are observed, based on the study programme mapping, as well as they provide support to students in achieving the tasks of the practical training and professional internship.

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.

At the end of the studies, the student has to develop a **diploma project**, which according to the LLU Study Regulations (LLU Senate decision No. 10-160, 12.05.2021.) is a type of final study work, i.e. an engineering solution of a problem, which confirms the acquisition of the student's theoretical knowledge and methodological skills in accordance with a certain professional standard and the scope of the study programme, the ability to obtain practically applicable results, as well as to formulate conclusions independently.

In accordance with the programme of the study course “Diploma project in Specialty”, the student compiles, analyses, develops a project, offers solutions, etc. At the end of the programme, students must develop a **diploma project on topical, innovative topics in the field of land management and surveying**.

The diploma project is defended before the State Examination Commission. The Commission operates in accordance with the Regulations of the Final Examinations of LLU. According to the requirements, the composition of the Commission includes professionals and lecturers with high professional qualifications.

The topics of diploma theses correspond to the latest trends represented in the study programme - land management, geodesy, spatial planning, land law, land management, land surveying, etc.

After licensing, the study programme was implemented starting from the academic year of 2015/2016, therefore, the first **diploma projects were developed in the academic year of 2018/2019. on these topics:**

- Application of geodetic and remote sensing surveying methods in quarry surveying for terrain model development;
- Application of remote sensing and geodetic surveying methods for the development of a topographic plan;
- Degraded territories in the spatial plan of Straupe rural territory of municipalities;
- Problems of land border discrepancies;
- Riga city local geodetic network development solutions;
- Land expropriation project under apartment houses;
- Application of surveying methods to determine the extent of quarries;
- Topographic surveying for forest drainage system reconstruction works;
- Engineering geodetic works for forest drainage system reconstruction;
- Proposals to eliminate land border discrepancies;
- Topographic survey of the reconstructed drainage system.

In the academic year of 2019/2020. diploma projects were developed on these topics:

- Land use planning project for the distribution of municipal land in Jelgava municipality;

- Land use planning project for the distribution of common property in Amata municipality;
- Thematic planning for recreation needs in Liepaja city;
- Application of different surveying methods in cadastral surveying;
- Expropriation of real estate for the construction of a state highway (Ķekava bypass);
- Development of small garden territory project in Ozolnieki municipality;
- Degraded building territories and their revitalization in Riga;
- Reconstruction of the main leveling network in Zemgale district of Riga;
- Farms "Krauklīši" territory organization project;
- Topographic surveying of underground communications for the needs of the Rail Baltica CS project;
- Land use planning project in Vaives municipality;
- Development of building 3D model of Faculty of Environment and Civil Engineering of LLU;
- Land use planning project for Jelgava city quarter.

In the academic year of 2020/2021. diploma projects were developed on these topics:

- Improvement of the Local Geodetic Network in the Northern Part of Dobeles Town;
- Spatial Planning of Grizinkalna Park for Recreational Needs;
- Land Use Planning Project in Ķekava Municipality;
- Demarcation of Mining License Area with Global Positioning;
- Establishment of a Geodetic Reference System for the Section of State Motorway A8;
- Development of an Indoor 3D model at the Faculty of Environment and Civil Engineering of LLU;
- Degraded Territories and their Revitalization Opportunities in the Vidzeme Suburb of Riga city;
- Arrangement of Ownership of Real Estate "Linumi" Buildings;
- Topographic Surveying for Power Line Reconstruction;
- Land Use Planning Project for Division of Joint Ownership in Valmiera;
- Lielvircava Manor Territory Organization Project;
- Land Cadastral Surveying of Real Estate "Gauja NP Kocēni".

During the defence of the diploma projects, the Defence Protocol is filled in for each student, in which the questions and the obtained evaluation are reflected. Thus, for example, in the 2018/2019 study year, 11 students defended diploma projects, of which 3 received a grade 10 (excellent), 2 - 9 (excellent), 4 - 8 (very good), 1 - 7 (good), 1 - 6 (almost good); In the 2019/2020 study year, 12 students defended diploma projects, of which 1 received a grade 10 (excellent), 2 - 9 (excellent), 3 - 8 (very good), 5 - 7 (good), 1 - 6 (almost good); in the 2020/2021 study year, 11 students defended diploma projects, of which 2 received a grade 10 (excellent), 2 - 9 (excellent), 1 - 8 (very good), 4 - 7 (good), 2 - 6 (almost good).

After each defence of the diploma projects, the State Examination Commission provides a report on the quality of the developed and defended works, their topicality in the labour market and the average assessment of the students.

For example, in the 2018/2019 academic year, 11 diploma projects were defended in the study programme. The State Examination Commission stated in its report that diploma projects are related to problems whose solutions can be used in the industry. In preparing the land management specialists, the State Examination Commission suggested to the Faculty and the Profiling Department that it is necessary to pay attention to the following:

- to maintain the balance and quality of land management and land surveying topics achieved in the development of diploma projects. to envisage the geodesy or land surveying section in land management diploma projects and vice versa - in the works on the topic of geodesy,

solutions of land use and cadastre issues, attracting appropriate consultants from the teaching staff of the department or outside;

- the ability to apply appropriate current terminology, wordings and methodological justifications needs to be further developed;
- the presentations must be able to show and explain the methods used in the development of a particular work, as well as the graduate must be able to justify why this work is being developed, what its contribution will be;
- to improve students' ability to express themselves clearly and unambiguously on professional and theoretical issues, as well as the skills to draw and formulate conclusions so that they are derived from the work, to strengthen the application of theory in the development of diploma projects.

In the 2019/2020 academic year, 12 diploma projects were defended in the study programme. In its report, the State Examination Commission again noted that the works involved problems whose solutions could be used in production. When preparing land management engineers, the Faculty and the Profiling Department need to pay attention to the following:

- to maintain the balance and quality of land management and land surveying topics achieved in the development of diploma projects.
- to develop the ability to apply appropriate current terminology, wordings and methodological justifications needs to be further developed;
- to improve students' skills to draw and formulate conclusions so that they can be derived from the work, to strengthen the application of theory in the development of diploma projects;
- this year's experience should be continued, when the members of the commission can get acquainted with the diploma projects in more detail in the e-learning environment before the defence of the diploma projects.

The expressed proposals are discussed at the meeting of the Department of Land Management and Geodesy and at the meeting of the Council of the Faculty of Environmental and Civil Sciences.

In order to promote the implementation of the recommendations of the State Examination Commission in the next study years, already in 2020/2021 academic year, during the development of the diploma project, more frequent consultations on the correct application of industry terminology are organized, as well as in order to promote regular work on the development of diploma projects, regular interim reports on the work are required.

In general, it can be concluded that the topics of students' diploma projects are topical, they correspond to the aim of the study programme, ensure the achievement of study results and correspond to the needs of the land use and land surveying industry and scientific trends.

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.

At the end of each semester, in the LLU e-environment, a **student survey** is conducted **on the quality of the study process and the work of the teaching staff**. The questionnaires are anonymous and are not personally related to a specific student, the obtained results are important for improving the quality of studies, therefore students are given the opportunity to express their

opinion by filling in the questionnaires conscientiously and objectively. However, it should be noted that students' participation in these surveys is not active, despite repeated calls from the study programme director and the faculty. Therefore, the results of the survey should be assessed with caution. In recent years, improvements to the survey have been gradually considered (optimizing the questions by reducing their number, improving feedback). In order to obtain a more complete opinion from students about the work of the lecturers and the study process, the Department of Land Management and Geodesy **has developed questionnaires for students, graduates and employers.**

The **answers of the surveyed students** (56%) show that studies promote the acquisition of knowledge in accordance with the requirements of specialization (71%), develop the ability to work independently (71%), provide opportunities to learn the application of the acquired knowledge in practice (72%). Students believe that there are opportunities to obtain good competitiveness in the labour market of their specialty (62%), to take full responsibility for their work in the specialty (49%). Students consider that the LLU has good relations with the teaching staff (80%). 78% of them admit that they would start studies again in this study programme. In general, students are satisfied with the offer of optional study courses (51%). Students want more offers and opportunities in the use of computer software (22%), real estate valuation (9%), new technologies (7%). Students believe that there are opportunities to get acquainted with foreign experience (53%), however, they want more guest lecturers (18%), more opportunities to do internships abroad (13%), they indicate that there is little special literature in foreign languages (9%). Students admit that the provision with technical means is insufficient (89%) - it is especially noted that there is a lack of the latest geodetic instruments (56%), low availability of computers (48%). It is recommended that the study literature and methodological instructions need to be supplemented (56%).

The **questionnaires received from the graduates** (18.4%) indicate that land management engineers are necessary for the Latvian economy and their current work is related (90%), incl. closely related (76%), to their specialty. Most graduates work in surveying and real estate companies (76%), in municipalities (9%), in the State Land Service (8%). The main types of work are - production (51%), control and supervision (25.5%), information collection and processing (21%). Graduates appreciate their level of preparation for a career when graduating from the study programme, and note that knowledge of law (3.6 points - according to the 5-point system) and technology (3.5 points) is most needed at work, and more attention should be paid to improving these skills.

The 35 **questionnaires received from employers** indicate that graduates are involved in various work related to the specialty, mostly in production work (91%), administrative work (77%), control (66%), information collection and processing (57%). The level of preparation of graduates upon graduating from the study programme was recognized as high (24%) or good (73%). The work abilities of the graduates of the study programme have been positively assessed:

- contact with colleagues (86%);
- solving theoretical problems (80%);
- working independently (71%);
- solving practical issues (63%);
- working with tools, computer equipment (51%);
- leading a team (40%).

The necessity of the graduates of the study programme - young specialists - in the Latvian economy is very much appreciated: yes - 59%, more yes than no - 41%. Employers acknowledge that the graduates of the study programme are knowledgeable and necessary, with extensive

knowledge in the fields necessary for the national economy: geodetic works; implementation of land management; real estate valuation; in the development of spatial planning projects; improving the rural environment. When hiring an employee, 69% of employers would prefer graduates of the study programme. Employers recommend stepping up training in computer science, the humanities and law, geodesy and economics. Based on the recommendations of employers, the content of several study courses has been revised, as a result of which it has been supplemented with more topical topics or improved. For example, the content of the study course "Photogrammetry and Remote Sensing" was improved, with an emphasis on the application of drone technologies and their data processing, the content of the study course "Computer Graphics in Land Management and Surveying" was supplemented with programming topics. In the development of practical work in several study courses, the process includes the use of GIS software, for example, the study courses "Real Estate Marketing", "Planning of Farm Territory".

All the results obtained in the surveys are used to improve the study process.

After the students' survey, the results of the lecturers' work performance evaluations are discussed at the meetings of the Department of Land Management and Geodesy twice a year. Discussions are held with the lecturer, in which the assessments of the quality of the lecturer's work provided in the surveys are discussed. For several years now, lectures have been observed to assess how the lecturers involve students in the lecture, how they work with the audience, how various materials and technical equipment is used. After the lecture, there are discussions with the lecturer about the possibilities of improving the work.

In general, the analysis and the examples provided showed that the results of surveys of students, graduates and employers and their recommendations are taken into account in improving the content and quality of studies.

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.

LLU has developed and implemented a system for the recognition of incoming and outgoing mobility opportunities, as well as study courses acquired during outgoing mobility (LLU Rector's Regulation No. 4.3. – 8/78 (02.22.2016.) "*On Procedure of Academic Recognition at LLU*" is available in the *Appendix No.8*). Full-time students take the opportunity to participate in mobility activities, but their activity could be more active. Most students use mobility in the second and third years of study.

A description of the possibility of participating in **student mobility within the ERASMUS+ mobility programme** has been posted on the LLU website (<https://www.llu.lv/lv/erasmus-studejoso-mobilitate> (in Latvian)), as well as a list of foreign universities with which mobility agreements have been concluded. The director of the study programme and the person responsible for mobility opportunities at VBF inform about the mobility opportunities offered by LLU. When applying for mobility, students prepare a study plan, which is coordinated with the director of the study programme. After the English language test, students take advantage of mobility opportunities according to the number of quotas available.

Recognition of the Erasmus + period is carried out by the director of the study programme after the student's return from Erasmus + studies, on the basis of the report card submitted by the student

and a previously signed application for recognition of study courses. In the recognition process, the evaluations of courses acquired during Erasmus + studies are not converted into a 10-point system, but instead of the evaluations of successfully completed courses, “recognized” is written, thus recognizing the credit points obtained in foreign universities.

The teaching staff of the Department of Land Management and Geodesy participated as partners in the **Interreg Latvia-Lithuania cross-border project GISEDU**, within which the study programme study courses were improved, including GIS topics, as well as students were offered the opportunity to participate in GIS knowledge development courses, thus acquiring in-depth knowledge in the study programme study course “Geographic Information Systems”. Outgoing mobility of students and participation in professional development courses is shown in *Table 3*.

Table 3

Outgoing mobility of students and professional development courses in the study programme

Academic year	Outgoing mobility programme / professional development courses	Number of students	Country	University
2017/2018	Erasmus +	1	Lithuania	Klaipeda State University of Applied Sciences
	Erasmus +	2	Poland	Wroclaw University of Environmental and Life Sciences
	Within the framework of the Interreg Latvian-Lithuanian cross-border project GISEDU	26	Lithuania	Klaipeda State University of Applied Sciences
2018/2019	Erasmus +	4	Malta	Malta College of Arts, Science and Technology
	Erasmus +	1	Lithuania	Klaipeda State University of Applied Sciences
	Erasmus +	1	Romania	Romania, Transilvanian University of Brasov

It should also be noted that several lecturers of the Department of Land Management and Geodesy participate in the organization of **BOVA** (Baltic Forestry, Veterinary and Agricultural University network) courses and conducting lectures, also involving students of the study programme. Student participation in these courses is very active (*Table 4*). The language of instruction of BOVA courses is English, as well as it should be noted that BOVA courses, which take place at LLU, are attended by students from Vytautas Magnus University (former Alexander Stulginski University) and the Estonian University of Life Sciences.

Table 4

Participation of students in BOVA courses

Academic year	Number of students	Title of BOVA course	Country	University	Corresponding study course in the study programme
2017/2018	6	Application Of Modern Technologies In Determination Of Geodetic Height System	Lithuania	Aleksandras Stulginskis University	"Geodesy II"
	12	"Land Management for Sustainable Development in Baltic Countries "	Latvia	Latvia University of Life Sciences and Technologies	"Land Management I", "Land Management II"
2018/2019	18	"Land Information Management for Sustainable Development in Baltic Countries "	Estonia	Estonian University of Life Sciences	"Land Management I", "Land Management II"
2019/2020	16 (full-time) 6 (part-time)	"Application of Modern Technologies in Reconstruction of Geodetic Networks"	Latvia	Latvia University of Life Sciences and Technologies	"Geodesy II"
2020/2021	14 (full-time) 6 (part-time)	"Application of Modern Technologies in Reconstruction of Geodetic Height System"	Latvia	Latvia University of Life Sciences and Technologies	"Geodesy II"

It should be noted that outgoing mobility opportunities are used only by full-time students of the study programme, part-time students do not choose it because they do not want to terminate their employment. However, in recent years, part-time students have also participated in BOVA courses.

In the analysed period, active **incoming study mobility** is observed (*Table 5*). Each semester, several foreign students choose to include in their mobility plan the study courses of the study program "Land Management and Surveying". The most popular study courses chosen by foreign students are "Geodesy II", "Computer Graphics in Land Management and Surveying", "Geographic Information Systems", "Land Management I", "Land Management II", "Land Use Planning", "Real Estate Marketing".

Table 5

Incoming mobility

Academic year	Number of students	Country	University
2015/2016	1	Czech Republic	Mendel University in Brno
	1	Germany	University of Applied Sciences Neubrandenburg
	2	Kazakhstan	Kazakh National Agrarian University
2016/2017	2	Kazakhstan	SH. Ualikhanov Kokshetau State University
	2	Kazakhstan	Kazakh National Agrarian University
	1	Belarus	Belarussian State Agricultural Academy
	1	Iceland	Agricultural University of Iceland
	1	Italy	Universita degli Studi della Tuscia
	1	Spain	University of Vigo, Spain
2017/2018	2	Turkey	Selcuk University
2018/2019	4	Lithuania	Kaunas Forestry and Environmental Engineering University of Applied Sciences
	2	Russia	Saint Petersburg State Forest Technical University
	1	Kazakhstan	Kazakh National Agrarian University
2019/2020	4	Lithuania	Kaunas Forestry and Environmental Engineering University of Applied Sciences
	1	Romania	University of Pitesti
	2	Turkey	Karamanoğlu Mehmetbey University
	1	Belarus	Belarusian State Agricultural Academy

	2	Russia	Saint Petersburg State Forest Technical University
	1	Ukraine	National University of Life and Environmental Sciences of Ukraine
2020/2021	3	Malta	Malta College of Arts, Science and Technology
	1	Slovākija	Slovak University of Technology in Bratislava
	2	Germany	Hochschule fuer Wirtschaft und Umwelt / Nuertingen-Geislingen University
	1	Germany	Technische Universität Carolo-Wilhelmina zu Braunschweig

The Covid-19 pandemic has encouraged students to become more actively involved in outgoing mobility in the last two years of the studies, but several students have already shown interest in participating in outgoing mobility under the Erasmus + programme.

In general, it can be considered that the level of mobility of students in the study programme is high, and the level of students' knowledge corresponds to the level of knowledge, skills and competencies of study courses implemented by other internationally recognized higher education institutions.

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 resources available for the implementation of the study programme are sufficient to ensure the achievement of the results of the study programme both now and in the long run.

Informative base

The study base for the students of the study programme, as well as for the teaching staff is mainly available in the **electronic environment** LLU IS. The system is designed as a comprehensive unified identity and application system that provides e-learning environment, lesson and examination period planning system, research support system, etc. In order to intensify the study process, students are provided with continuous access to the unified study support system of the LLU. At the moment, students are provided with the following features to ensure the study process, especially in the current Covid-19 pandemic:

- publishing of lectures, practical work, laboratory work, seminar presentations and materials;
- conducting lectures online, including pre-arranged video recordings, or automatic online recording;
- electronic processing of tests, test papers, as well as independent works;
- information about the student's progress;
- access to the documents regulating the study process and their changes;
- etc.

The scientific and information base consists of extensive resources at the disposal of LLU. For example, **the provision of a database and the latest scientific and study literature.**

In the study programme, the study process is fully provided with the latest study literature, which is available to students in the Fundamental Library of the LLU, its reading room and the information centre of the Faculty of Environmental and Civil Sciences. The Fundamental Library of the LLU offers students, as well as the teaching staff, access to subscribed electronic databases, as well as temporary trial databases. The following databases are available to the students:

- CAB Abstract
- CABI Crop Protection Compendium;
- CABI Forestry Compendium;
- CRC Press e-books;
- EBSCO databases;
- EBCCO eBook Academic Collection;
- Newspaper library;
- Letonika;
- ScienceDirect journal;
- Scopus;
- Scival
- Web of Science;
- Wiley Online.

In each of these databases, students can obtain different types of information on the relevant topics within the study courses of the study programme.

In order to supplement the number of informative sources and update the content of publications available in the library for the implementation of the study programme, LLU cooperates with the Faculty of Environmental and Civil Sciences and the Department of Land Management.

Students use the sources of information obtained in the available databases, as well as in the collections of the Fundamental Library of the LLU and the information centre of the Faculty of Environment and Civil Engineering, in the development of independent works, term papers and course projects, scientific papers and the diploma project.

The material and technical base for the study process of the study programme is formed by the material and technical base and infrastructure of the Department of Land Management and Geodesy, as well as the departments / institutes involved in the study process.

Students use the sources of information obtained in the available databases, as well as in the collections of the **Fundamental Library of the LLU** and the **Information centre of the Faculty of Environment and Civil Engineering (VBF)**, in the development of independent works, term papers and course projects, scientific papers and the diploma project. The Library Resources and publications available for the provision of the study program are available at VBF website under section Information Centre: <http://www.vbf.llu.lv/lv/informacijas-centrs> (only in Latvian).

The material and technical base

The material and technical base for the study process of the study programme is formed by the material and technical base and infrastructure of the Department of Land Management and Geodesy, as well as the departments / institutes involved in the study process.

The Department of Land Management and Geodesy has 4 lecture halls, 2 computer classrooms, 4 laboratories - **Photogrammetry Laboratory**, **GIS Competence Center**, **Surveying Training Laboratory** and **Geodetic Instruments Calibration Laboratory**. Each lecture hall has a stationary control computer and projector, automatic drop-down screen, Internet access. Lecture hall No. 902 is equipped with an interactive whiteboard. Two lecture halls are provided with portable interactive screens. The department has two computer classrooms, No. 901 - equipped with 20 workstations computers, where the computer equipment and software is constantly updated as much as possible, as well as it is available to every student of the study programme, computer classroom No. 304 is equipped with 12 workstations, powerful computer equipment, which was purchased within the framework of the Interreg Latvian - Lithuanian cross-border project GISEDU. The photogrammetry laboratory has 7 workstations. The computer equipment is equipped with all the latest computer software required to ensure the study process at a high quality, such as Oracle, MicroStation, Liscad, SPSS, TRIMBLE business centre, Fotomod, Pix4d, ArcGIS map, ArcGIS Pro.

Thanks to attracted ESF, INTERREG and funding from other projects, modern, state-of-the-art toolkits have been purchased, such as electronic tachometers, digital levelers, optical theodolites, optical levellers, digital rangefinders, global positioning equipment (single-frequency and dual-frequency), closed engineering search equipment, robotic tachymeter, ground scanner, unmanned aerial vehicle (drone), photogrammetric camera, as well as laths, stands, measuring tapes, reflectors and other materials necessary for the performance of the surveying process. The GIS Competence Center houses a large-format scanner for scanning cartographic images, as well as a plotter and a 3D printer, which students use in the process of developing scientific and diploma projects.

In the last two years, the ERDF projects "Strengthening the Research, and Development Infrastructure and Institutional Capacity of LLU and of the Scientific institutions under its Supervision" (No. 1.1.1.4./17/I/003) and "Modernization of STEM Study Programmes" (No.8.1.1.0 / 17 / I / 001), and by investing the proceeds of the Faculty of Environmental and Civil Engineering, significant repair works were performed, computer hardware, equipment and tools, equipment were purchased.

For example, a Laboratory Calibration Laboratory has been established in the laboratory building. Additional equipment, tools and devices have been purchased - GNSS tool set Stonex S700A; Stonex X300 Surface 3D Laser Scanner Kit; Computer desktop HP EliteOne 800 G5 AIO 23.8" 5NW35AV with Win10Pro and 5gg.

Computer equipment has been renewed in computer classroom No. 901, as large amounts of data are increasingly used, the processing of which requires high-performance workstations (10 desktop computers Capital NEO GX33 MT with Win10Pro and 3g were purchased). The computer classroom

provides opportunities to work with Microstation, ArcGIS and other computer software.

New measuring instruments were purchased for the land surveying training laboratory, because the existing measuring equipment base of the measuring instruments was worn out and it was necessary to renew it. 7 optical theodolites Fet 500, Geo-Fennel; rotary leveller EL 515 Plus SEt, Geo-fennel; 7 optical theodolites with electronic display Stonex STT 402L; GNSS equipment set Stonex S900A; Stonex S40 with Cube-A software were purchased.

Also, computer **software** (Microstation, ArcGIS), which are necessary for work in the study process, are maintained and subscribed to every year at the expense of the Faculty. AutoCAD, a program offered in the Academic Network, is also available at the Faculty.

A cooperation agreement has been concluded with the **State Land Service on the use of cadastral data** from the database of the State Real Estate Cadastre Information System. These data are actively used in the development of term papers and course projects, research papers and diploma projects.

Financial resources for the implementation of the programme

The number of **state-funded study places** is coordinated in a tripartite agreement between the Ministry of Education and Science (MES), the Ministry of Agriculture (MA) and the Latvia University of Life Sciences and Technologies (LLU). The tripartite financing agreement for **2021** stipulates that the basic cost of one study place is 1630.11 EUR, the study level coefficient for Bachelor's programmes is 1 and the social funding of one study place for Bachelor's programmes is 164.34 EUR, the study cost coefficient for the Bachelor's programme "Land Management and Surveying" is 3.1 (coefficients for each thematic area of education are different, they are stipulated in the regulations of the Cabinet of Ministers "Procedures for Financing Higher Education Institutions and Colleges from the State Budget"), costs per student in the Bachelor's "Land Management and Surveying" amount to 5217.66 EUR. Changes in state funding for one state-funded study place (2015-2020) in the professional bachelor's study programme "Land Management and Surveying" are shown in *Figure 3*.

In 2021, the **tuition fee** in the study program is 980 EUR per semester or 1960 EUR per year for full-time studies and 700 EUR per semester or 1400 EUR per year for part-time studies in the Latvian language. For foreign students the tuition fee will be set after accreditation of the study direction.

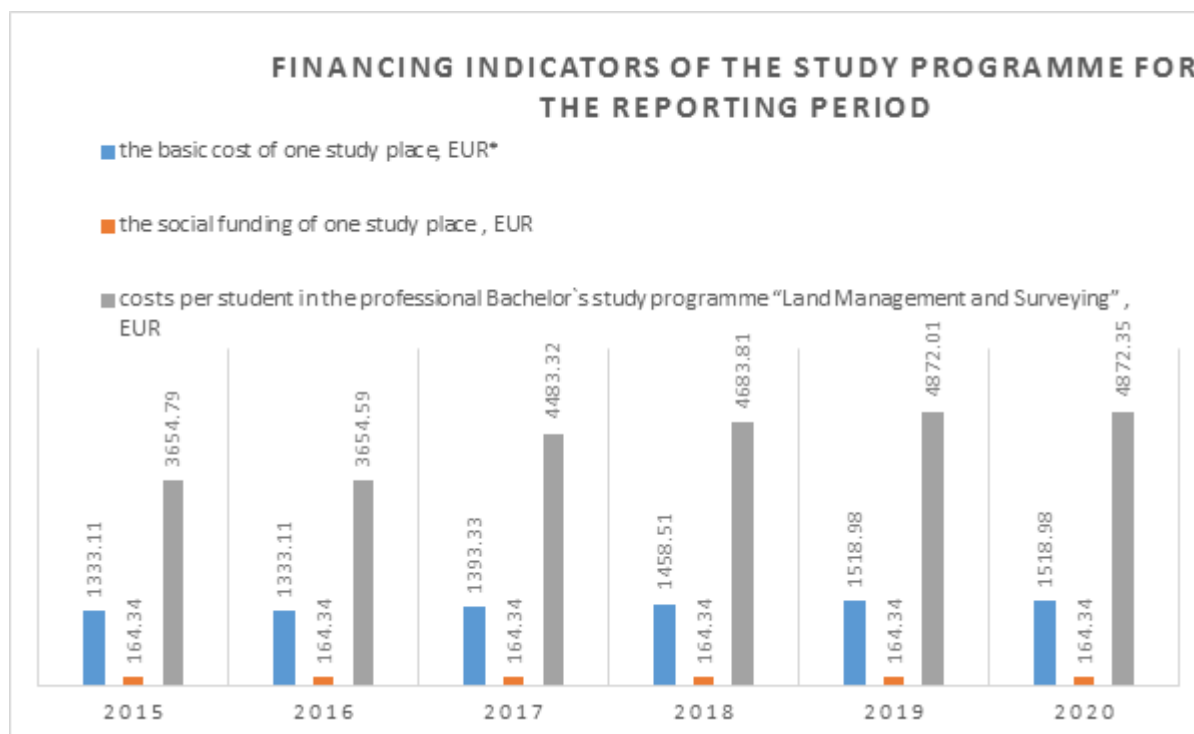


Fig.3 changes in state funding for one state-funded study place in the professional bachelor's study programme "Land Management and Surveying"(period 2015-2020)

* Cost per student slightly differ at the same basic data (the basic cost of one study place and the social funding of one study place) in 2015 and 2016, and 2019 and 2020, because every year the provision of the study coefficient is provided in % with some decimals and may be slightly different. Rounding up, this provision is 100%, but, in figures in the contract in 2020 it was - 99.98242%, in 2019 - 99.97517%. Similar situation was in 2016 and 2015, when the provision was 85%, but in figures in the contract in 2016 - 84.45564%, in 2015 - 84.46058%.

Every year, the LLU Senate approves the distribution of revenues and expenditures of the general budget structure of the LLU, prepared in accordance with the Law on the State Budget, passed annually by the Parliament and the annual order of the LLU Rector "On Planning the General Budget of the LLU". 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 approving the distribution of the 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 the Rector, Vice-Rectors, Chancellor, LLU Director, Deans of all faculties, Head of Resource Accounting Center / Chief Accountant Head of the 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% are other costs. 60% of the paid study funding consists of remuneration costs and 40% are 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 scientific base is calculated and allocated annually from the active research activities. Science base funding in the amount of 50% is at the direct disposal of the faculty and 50% is used to cover centralized costs. Research funding consists of funding attracted for the implementation of projects.

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

In 2020, the share of costs of the Bachelor's study program "Land Management and Surveying" consisted of:

- Remuneration - 71%
- Scholarships - 7%
- Goods and services - 19% incl. utilities - 8%
- Fixed capital formation - 3%.

Additional financial support opportunities for students in the programme

State scholarships in the professional Bachelor's study programme until 1 January, 2020 were 99.60 EUR, but for the period from 01.01.2020 until 31.12.2021, the scholarships are intended to reach 200 EUR per month. In one study year, scholarships are awarded to an average of 13 students, according to the number of successful students, the scholarships are distributed in proportion to the students of each study year who have received the highest grades. Students in the programme also have the opportunity to apply for several scholarships managed by the Development Fund of the LLU, as well as the scholarship of J.Bikis of the Faculty of Environment and Civil Engineering. Such scholarships have been received by 6 students of the programme during the reporting period, incl. 1 student has received a scholarship of Kārlis Ulmanis, 1 student has received a scholarship of Jānis Čakste, 1 student has received a scholarship of Mirdza Oškalne and 3 students have received a scholarship of J.Bikis.

In general, it can be concluded that the study base, scientific base, information base, material and technical base and financial base comply with the specifics of the study programme, its implementation conditions, as well as student-centered education principles and creates preconditions for achieving study results and indicates the possibility to ensure a high quality study process.

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.

Teachers from 13 different structural units of LLU are involved in the implementation of the study programme - Department of Land Management and Geodesy (16 lecturers), Department of Environment and Water Management (two lecturers), Department of Architecture and Building (one lecturer), Department of Landscape Architecture and Planning (one lecturer), Language Center (one lecturer), Institute of Business and Management Science (two lecturers), Institute of Soil and Plant Sciences (one lecturer), Department of Forest Utilization (one lecturer),

Department of Physics (one lecturer), Department of Mathematics (one lecturer), Institute of Economics and Regional Development (one lecturer), Institute of Education and Home Economics (one lecturer) and Department of Control Systems (one lecturer).

Professors, associate professors, docents, lecturers and assistants participate in the process of realization of the study programme, incl. highly qualified professionals with relevant work experience, the characteristics of which are shown in the life and work history (CV) of each lecturer. The list of academic staff and their CVs are included in *appendixes of II chapter of the report Characteristics of the study direction*. The leading department in implementation of the professional bachelor's study programme "Land Management and Surveying" is **the Department of Land Management and Geodesy** of the Faculty of Environment and Civil Engineering. Therefore, composition of academic staff at the Department is shown in *Table 6*.

Table 6

Composition of academic staff at the Department of Land Management and Geodesy in the reporting period

Position	2015/ 2016	2016/2017	2017/2018	2018/2019	2019/2020
Foreign professors on employment contract	1	1	1	1	1
Professors (Emeritus)	-	-	-	-	1
Professors	2	2	2	2	2
Associate professors	1	1	2	2	1
Assistant professors	4	3	2	3	3
Lecturers	5	7	6	9	7
Assistants	1	-	1	2	2
TOTAL	14	14	14	19	17

It should be noted that in the analysed period **guest professors from foreign universities** participated in the work of the study programme on the basis of an employment contract with LLU. For example, in the 2015/2016 academic year and 2016/2017 academic year, within the study courses "Land Management I", "Spatial Planning I", "Land Management Design", lectures were given by the professor from the Aleksandras Stulginskis University (Lithuania), in the 2017/2018 academic year, within the study courses "Geodesy I" and "Geodesy II", lectures were given by the professor from the Lviv State Polytechnic University (Ukraine), in the 2018/2019 academic year, within the study course "Real Estate Cadastre", lectures were given by the professor from the University of Warmia and Mazury in Olsztyn (Poland), in the 2019/2020 academic year, within the study course "History of Land Management and Surveying", lectures were given by the professor from the University of Warmia and Mazury in Olsztyn (Poland). In the 2020/2021 academic year, due to the Covid-19 pandemic, if the situation improves, the professor from Vytautas Magnus University (Lithuania) will start working in the next academic year.

Analysing the overall changes in the teaching staff, there are positive trends in the number of

positions, however, it should be noted that there are small changes in the groups of lecturers and assistants every academic year, because teaching assistants start working as lecturers in the next academic year. It should be noted that two lecturers in the position of lecturer are working on the final phase of their doctoral theses, thus, after defending them, the number of lecturers holding the position of assistant professor in the Department of Land Management and Geodesy will increase.

Analysing the total composition of the teaching staff involved in the implementation of the study programme (*Table 7*), it should be noted that the largest share is observed in the groups of lecturers (34%) and assistant professors (30%). Currently, the majority of lecturers in the study programme are aged 31 to 40, as evidenced by the curricula vitae (CV) provided in *appendixes of II chapter of the report Characteristics of the study direction*. Thus, conclusions can be made on the renewal of the teaching staff.

Indicators characterizing the teaching staff involved in the study programme (2020/2021)

By position:

<i>Position</i>	<i>Number</i>	<i>Proportion,%</i>
Professor (Emeritus)	2	7
Professor	4	13
Associated professor	1	3
Assistant professor	9	30
Lecturer	10	34
Assistant	4	13
<i>TOTAL</i>	<i>30</i>	<i>100</i>
incl. faculty members who are leading researchers in the field	10	34
researchers	3	10
research assistants	2	7

By scientific degree:

Doctors of Science	15	50
Masters	13	43
Bachelors	2	7
<i>TOTAL</i>	<i>30</i>	<i>100</i>

In general, it should be noted that purposeful measures are taken to ensure that changes in the teaching staff have a positive impact on the development of the study programme and the quality of implementation, as well as responsibility for the requirements specified in regulatory

enactments. Changes in the teaching staff of the study programme since the 2015/2016 academic year have a positive dynamic, which can be explained by the well-thought-out implementation of the personnel policy and continuous updating of 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.

Teaching staff and highly qualified professionals with relevant work experience participate in the process of implementation of the professional Bachelor's study program, the characteristic indicators of whom are provided in their CVs. The list of academic staff and their CVs are included in *appendixes of II chapter of the report Characteristics of the study direction*. The composition of the teaching staff corresponds to the specifics of the study courses and the implementation requirements. The qualification of the teaching staff involved in the implementation of the study programme complies with the conditions of the study programme implementation and the requirements of the regulatory enactments.

Lecturers, guest lecturers, as well as doctoral students elected to the academic positions of the LLU are involved in the implementation of the study programme. Employees who work in various scientific projects are also involved in the implementation of the study programme, so that the knowledge gained in the projects can be transferred to the study programme by improving the content of the study courses. It should be noted that these lecturers have been elected to the positions of leading researchers, researchers and research assistants, who, in accordance with regulatory documents, are also academic staff. In total, in the 2020/2021 academic year, 30 lecturers work in the study programme, including 19 lecturers who have been elected to academic positions; 11 have not been elected. Three doctoral students are involved in the implementation of the study programme.

The **teaching staff** of the Department of Land Management and Geodesy actively **participates in professional development courses (including abroad), conferences, seminars, attends exhibitions** (*Table 8*) in order to incorporate the gained experience and knowledge in the content of study courses and teaching methods. For example, in the reporting period 7 lecturers have attended modules offered by LLU in the courses "Innovations in Didactics of Higher Education", 4 lecturers have participated in QGIS training at Klaipeda University of Applied Sciences, 7 lecturers have attended 3D modeling and printing training at LLU, 4 lecturers have attended the ArcGIS courses at the Klaipeda University of Applied Sciences, 6 lecturers have participated in unmanned aerial vehicle (drone) piloting training.

In exchange of experience, 3 lecturers of Land Management and Geodesy Department studied the application of GIS technologies in the training of students at the Polytechnic University of Valencia, Spain for 2 weeks.

Table 8

Distribution of the number of lecturers of the Department of Land Management and

Geodesy by professional development activities

<i>Academic year</i>	<i>Professional development courses (incl. foreign language)</i>	<i>Professional development conferences, seminars</i>	<i>Professional development exhibitions</i>
2015/2016	4	7	-
2016/2017	5	10	3
2017/2018	12	0	3
2018/2019	6	5	6
2019/2020	5	4	-
TOTAL	32	26	12

It should be noted that the teaching staff actively improves their qualifications by attending practical conferences and seminars, which are organized for specialists in the field, thus students are informed about current trends in the field within the study courses. In recent years, several lecturers have participated in the international exhibition INTERGEO, as a result of the experience gained in the exhibition, the Geodetic Instruments Calibration Laboratory has been equipped, and within the framework of surveying courses students are introduced to the latest technologies in land management and surveying.

The teaching staff of the Department of Land Management and Geodesy actively improves their qualification by participating in the **Erasmus + mobility program**, with guest lectures at foreign universities. For example, lecturers have given 8 lectures under the Erasmus + program at the following foreign universities: John Moore University, Liverpool, UK; Aleksandras Stulginskis University, Lithuania; Mendel University in Brno, Czech Republic; University of Warmia and Mazury, Poland; Wroclaw University of Environmental and Life Sciences, Poland; Klaipeda State University of Applied Sciences, Lithuania; AGH University of Science and Technology, Poland; Kaunas University of Forest and Environmental Engineering, Lithuania, etc. The topics of the lectures are related to the study courses taught by the teaching staff in the study programme, that is - Cadastre, land reform and land resource management; Geodesy, geodetic networks, photogrammetry, remote sensing; Land reform; Land consolidation; Real estate appraisal; Land cadastral surveying; Application of GIS in spatial planning.

The teaching staff is actively involved in organizing **BOVA networking courses**, as well as giving lectures in these courses (*Table 9*). It should also be noted that full-time and part-time students of the study programme are also involved in these courses. The topics of the courses are related to the topics included in the study courses of the study programme, the courses are conducted in English, thus both the teaching staff and students have the opportunity to improve their English language skills by increasing their professional qualification.

Table 9

Involvement of teaching staff in organizing BOVA courses and giving lectures

Academic year	No. of lecturers	Title of BOVA course	Country	University
2017/2018	2	Application Of Modern Technologies In Determination Of Geodetic Height System	Lithuania	Aleksandras Stulginskis University
	2	“Land Management for Sustainable Development in Baltic Countries “	Latvia	Latvia University of Life Sciences and Technologies
2018/2019	2	“Land Information Management for Sustainable Development in Baltic Countries “	Estonia	Estonian University of Life Sciences
2019/2020	3	“Application of Modern Technologies in Reconstruction of Geodetic Networks”	Latvia	Latvia University of Life Sciences and Technologies
2020/2021	3	“Application of Modern Technologies in Reconstruction of Geodetic Height System”	Latvia	Latvia University of Life Sciences and Technologies

The information in the table shows that the topics of the courses are related to the topics included in the study courses of the study programme, the courses are conducted in English, thus both the teaching staff and students have the opportunity to improve their English language skills by increasing their professional qualification.

The improved qualification of each teaching staff contributes to the improvement of the content and quality of the study courses led by them, which allows to achieve more fully the results of the study course and in general the study results of the study program.

The suitability and high level of qualification of the teaching staff is justified by the **international and local level, incl. industry, awards and recognitions**. Thus, for example, two lecturers have been awarded the III degree medal of the Ukrainian Society of Geodesy and Cartography “For Merits in Geodesy and Cartography”; one lecturer was awarded the medal of the Ministry of Agriculture of the Republic of Latvia “For Diligence”; one lecturer received the Latvian Surveyors' Association Honorary Badge “FOR MERIT IN LATVIAN SURVEYING” for highly professional achievements, for high-quality and selfless activities, lifetime and special investments in the Latvian surveying sector and its development; a letter of thanks to two lecturers of the LLU for a significant contribution to the development of new study programmes; for one lecturer, a badge of the LLU emblem for long-term honest pedagogical, scientific and social activities and contribution

to the training of new specialists at the University.

In general, it can be concluded that the qualification of the teaching staff involved in the implementation of the study programme complies with the conditions of the study programme implementation and regulatory enactments, ensures the achievement of the study programme and the corresponding study course objectives and study results.

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.

In accordance with the LLU Development Strategy 2015-2022, the Department of Land Management and Geodesy implements scientific research activities in two directions: in the field of engineering - ***Remote sensing, geodesy and geospatial research*** - and in the field of social sciences - ***Land and real estate management research***.

The teaching staff of the study programme is actively involved in scientific research both at the national and international level. Thus, for example, during the reporting period the following **projects** have been implemented and are still being implemented:

- Interreg Latvia-Lithuania Programme 2014-2020 project „Creation of Joint GI Education to Increase Job Opportunities in the Region” (Nr. LLI-206). Implementation time 01.04.2017. - 31.03.2019. (763522,85 EUR).
- LLU Program "Research Capacity Building LLU" project "Possibilities of application of geographical information systems and remote sensing technologies in spatial planning in Latvia" (Z-17). Implementation time 10.05.2017 - 09.05.2019. (7600 EUR)
- LLU Program "Research Capacity Building LLU" project "European Vertical Reference Systems

transnational impact areas" (A05 – 07). Implementation time 01.01.2017. – 31.12.2018. (7865 EUR).

- Interreg Latvia-Lithuania Programme 2014–2020 project „Innovative brownfield regeneration for sustainable development of cross-border regions” (BrownReg).
- Digitization of beekeeping, project no. 18-00-A01620-000002, LAD9 State and EU support for measure 16 "Cooperation" 16.2. sub-measure "Support for the development of new products, methods, processes and technologies" project Implementation time 25.10.2018. – 31.10.2019. (99000 EUR).
- Application of remote sensing technologies for evaluation of orchards, project 18-00-A0160-000039, LAD21 State and EU support measure 16 "Cooperation" 16.2. project of the sub-measure "Support for the development of new products, methods, processes and technologies". Implementation time 03.06.2019. – 03.06.2023. (49 7000 EUR). Leading partner.

The study programme attracts teaching staff who also carry out active scientific research activities, participating in **international conferences** as well as preparing **publications** in accordance with the study course topics. The latest research results are included in the content of the study programme, thus ensuring constant updating of the study programme and study courses.

The general list of publications of the teaching staff involved in the study programme is attached to *the appendixes of II chapter of the report Characteristics of the study direction*.

Analyzing in more detail the publications of the teaching staff of the Department of Land Management and Geodesy in the period from 2015/2016 academic year until 2019/2020 academic year (*Table 10*), it should be noted that the total number of publications is 140, incl. 51 publications in international, peer-reviewed scientific journals included in Web of Science or Scopus scientific literature databases and 89 publications in anonymously-reviewed international scientific journals, incl. proceedings. Publications are mainly published in the following databases – Crossref, Web of Science, Scopus, EBSCO host Academic Search Complete, EBSCOhost Academic Search Ultimate, DOAJ, EBSCO, Primo Central (ExLibris), AGRIS, EBSCO Discovery Service, Proquest, Google Scholar.

Table 10

Publications and reports of the teaching staff of the Department of Land Management and Geodesy (2015-2020)

Type of publication or report	Number per academic year					
	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Total
International, peer-reviewed scientific publications included in Web of Science or Scopus scientific literature databases	9	5	13	10	14	51
Publications in anonymously-reviewed international scientific journals, incl. proceedings	12	15	7	26	29	89
<i>Total publications</i>	21	20	20	36	43	140
Other scientific publications	14	33	0	4	4	55
Materials of international conferences (Abstracts)	19	12	8	4	8	51
Papers in international scientific conferences	25	30	27	33	18	133

Papers at other conferences	3	13	1	3	2	22
Popular science and scientifically-methodical publications	0	5	4	1	1	11

Faculty members actively participate in international scientific conferences with reports and poster reports on research results. The teaching staff of the Department of Land Management and Geodesy has given a total of 155 reports, incl. 133 reports at international scientific conferences. More detailed information on the participation of the lecturers in the conferences is provided in the curricula vitae (CV) attached to *the appendixes of II chapter of the report Characteristics of the study direction*.

It should be noted that each of the majority of the teaching staff involved in the study programme has published in peer-reviewed publications, including international ones, during the last six years. Some lecturers have a smaller number of publications, as they have recently started working at LLU, it should also be noted that some lecturers do not have publications, this is due to the fact that these lecturers work full time in the field and have at least five years of practical experience, which is in accordance with the Higher Education Law. These lecturers lead practical training and internships in the study programme.

In general, it can be concluded that the teaching staff of the study programme is involved at both national and international level in scientific research in the field of land management and surveying corresponding to the content of the study programme, and the obtained information is applied in the study process.

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 study programme implemented by the Department of Land Management and Geodesy is **interdisciplinary**. The content of the study programme consists of study courses in engineering, social sciences and other interdisciplinary, environmental and labor protection courses. Thus, the study courses of the programme are **implemented by lecturers from 13 different structural units of LLU** - Department of Land Management and Geodesy (16 lecturers), Department of Environment and Water Management (two lecturers), Department of Architecture and Building (one lecturer), Department of Landscape Architecture and Planning (one lecturer), Language Center (one lecturer), Institute of Business and Management Science (two lecturers), Institute of Soil and Plant Sciences (one lecturer), Department of Forest Utilization (one lecturer), Department of Physics (one lecturer), Department of Mathematics (one lecturer), Institute of Economics and Regional Development (one lecturer), Institute of Education and Home Economics (one lecturer) and Department of Control Systems (one lecturer).

Several of the teaching staff involved in the study process are **industry professionals** who mainly participate in the management of practical training. In separate study courses in the management of practical and laboratory works, organization and management of study tours to surveying companies, teaching staff and specialists of the field co-operate with each other, thus promoting

the acquisition of professional knowledge and skills specified in the professional standard.

In order to achieve the results of the study programme, several **study courses have integrated interdisciplinary themes**, where the mutual cooperation of the teaching staff makes a significant contribution in order to promote the interconnection of study courses and logical, sequential acquisition. For example, in the implementation of the study course “Geodesy I” with the total volume of 8CP, there are four lecturers involved from three structural units of the LLU - two lecturers from the Land Management and Geodesy Department, who provide insight into the basic aspects of geodesy and geodetic instruments, one lecturer from the Department of Physics, who provides knowledge of physical phenomena, linking them with the core aspects of the operation of geodetic instruments and one lecturer from the Department of Mathematics, promoting understanding of mathematics in connection with the core issues of geodesy. Thus, the teaching staff, through mutual cooperation, promotes the students' understanding of the necessity and connection of knowledge of physics and mathematics with the basic theoretical course of geodesy. Such principle of cooperation of the teaching staff is included in several study courses of the study programme, ensuring the interconnection of the study courses in the study programme.

In order to promote cooperation between the teaching staff of the LLU and the Department of Land Management and Geodesy, a system has been established that ensures regular attendance of academic conferences and professional development conferences and seminars for the development of methodological competencies in teaching. For example, every January, an Academic Conference is organized at the LLU, where examples of good practice in organizing, managing and evaluating the study process is provided. Every year in the first week of January, the Department of Land Management and Geodesy organizes a scientific-practical conference “Land Management and Geodesy” on topical issues of the industry. Such activities promote the development of the teaching staff and provide an opportunity to cooperate more effectively in the teaching and improvement of study courses.

At the time of submitting the report, 83 students are studying in the study programme. **The ratio of students to lecturers** is 13.5, i.e. slightly above the ratio of students to lecturers at LLU, which is 13.2.

After the overall analysis, it can be concluded that within the framework of LLU and the study programme a mechanism for mutual cooperation of the teaching staff has been created in order to promote the improvement of study courses and the interconnection thereof.

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	1_appendix_ZIM_statistics_ENG.pdf	1_pielikums_ZIM_studejoso_statistika_LV.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	2_appendix_ZIM_content_to_education_standart_ENG.pdf	2_pielikums_ZIM_atbilstiba_izglitibas_standartam_LV.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard (if applicable)	3_appendix_relevance_to_profession_standart_ENG.zip	3_piel_atbilstiba_prof_standartam_LV.zip
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	6_appendix_ZIM_study_courses_mapping_ENG.pdf	6_pielikums_ZIM_studiju_kursu_kartejums_LV.pdf
Curriculum of the study programme (for each type and form of the implementation of the study programme)	4_appendix_study_plan.rar	4_pielikums_studiju_plans.rar
Descriptions of the study courses/ modules	5_appendix_Study_course_description_ENG.zip	5_piel_kursu_apraksti_LV.zip
Description of the Study Direction - Other mandatory attachments		
Sample of the diploma to be issued for the acquisition of the study programme.	ZIM_BAK_diploms_pielikums_ENG.pdf	ZIM_BAK_diploms_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	agreement_RTU_LL.U.rar	vienosanas_RTU_LL.U.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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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_apliecinajums_Arhitektura_un_buvnieciba_EN.docx	LLU_apliecinajums_Arhitekturas_un_buvniecibas_studiju_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		
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.		