

## APPLICATION

Study field "Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science" for assessment

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
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# **Self-evaluation report**

Study field "Information Technology, Computer Hardware,  
Electronics, Telecommunications, Computer Management,  
and Computer Science"

University of Liepāja

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# 1. Information on the Higher Education Institution/College

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

**University of Liepaja (hereafter - LiepU) is the Kurzeme Regional Centre of higher education, science and culture, which contributes to regional development in the Latvia and international context.**

### **Liepaja University Development Strategy for 2016-2020**

[https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja\\_University\\_Development\\_Strategy\\_Summary\\_2016-2023\\_25.01.2021.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja_University_Development_Strategy_Summary_2016-2023_25.01.2021.pdf)

LiepU based on the letter No. 4-10e/21/99 of the Ministry of Science and Education of 11.01.2021. Regarding the development strategies of institutions with decision of LiepU Senate of 25.01.2021. has prolonged the development strategy until 31st December 2023.

**Mission of LiepU:** be the promoter of Kurzeme education, science, innovations and culture development, which provides competitive, nationally and internationally significant studies necessary for the regional development, implements nationally and internationally acknowledged research, related to the studies, and promotes sustainable development of the society.

**Values of LiepU:** human being, collaboration, growth, Latvia

**Overall goal of LiepU:** provide acquisition opportunities of higher professional, academic education and life-long education based on research, necessary for the region, on Latvia and international scale competitive and qualitative, promoting development of national economy based on knowledge and professional competences and strengthening of creative, culture-orientated society.

### **The University's objectives are:**

- to develop study, research, and lifelong learning programmes that provide the human resources needed for the future needs of the growing economy, the nation, and the public, in line with job market requirements, and to promote the uplifting of those involved in education into enterprising, creative, responsible, and competitive members of society;
- to carry out applied and fundamental research, and to transfer knowledge and technology to the relevant sectors of the economy through innovation and lifelong learning processes, making it possible for the sectors to adapt dynamically to changes in the external environment;
- to be an important cultural centre for Kurzeme, Latvia, and the Baltic region.

**Quality Policy of LiepU:** provide acquisition opportunities of higher professional, academic education and life-long education based on research, necessary for the region, competitive and qualitative on Latvia and international scale, promoting development of national economy based on knowledge and professional competences and strengthening of creative, culture-orientated society, taking into account European Standards and guidelines for quality provision in the European (ESG-2015).

In 2018 three mid-term planning documents were developed which are directed towards the development of LiepU human resources.

1. LiepU Human Resources Development Plan 2018–2023;
2. Action Plan of LiepU Academic Staff Development 2018– 2022;
3. Training Plan of LiepU Management Staff 2018– 2021.

In the beginning of the evaluation period 10 study directions were implemented at Liepaja University. Currently its number has decreased and is 8. First level, bachelor, master and doctoral study programmes are being implemented in these directions.

### **Study directions and study programmes of Liepaja University:**

#### *Study Direction “Education and pedagogy”*

- First level vocational higher education study programme “Preschool Teacher”
- Professional bachelor study programme “Speech Therapy”
- Professional bachelor study programme “Primary Education Teacher”
- Professional bachelor study programme “Teacher”
- Second level vocational higher education study programme “Teacher”
- Academic master study programme “Educational Sciences”
- Doctoral study programme “Educational Sciences”

#### *Study Direction “Arts”*

- Academic master study programme “New Media Art”
- Professional bachelor study programme “Design”
- Joint academic master study programme with RISEBA University “New Media and Audiovisual Art”
- Doctoral study programme “Media Art and Creative Technologies”

#### *Study Direction “Language and culture studies, native language studies and language programmes”*

- Academic bachelor study programme “European Languages and Culture Studies”
- Academic bachelor study programme “Baltic Philology, Culture and Communication”
- Academic master study programme “Writing Studies”
- Joint Doctoral study programme with Ventspils University of Applied Sciences “Linguistics: Latvian Diachronic and Synchronic Linguistics, Applied Linguistics, Comparative and Contrastive Linguistics”

#### *Study Direction “Management, administration and real estate management”*

- Professional bachelor study programme “Business and Organization management”
- Professional bachelor study programme “Culture Management”
- Professional bachelor study programme “Tourism and Recreation management”
- Professional master study programme “Management Sciences”

#### *Study Direction “Information technology, computer technology electronics, electrical engineering, telecommunications, computer control and computer science”*

- Professional bachelor study programme “Information Technology”
- Professional bachelor study programme “Smart Technologies and Mechatronics”
- Academic bachelor study programme “Computer Sciences”

- Professional master study programme “Information Technology”
- Doctoral study programme “E-Study Technologies and Management”

*Study Direction “Health care”*

- Professional master study programme “Art therapy”

*Study Direction “Social welfare”*

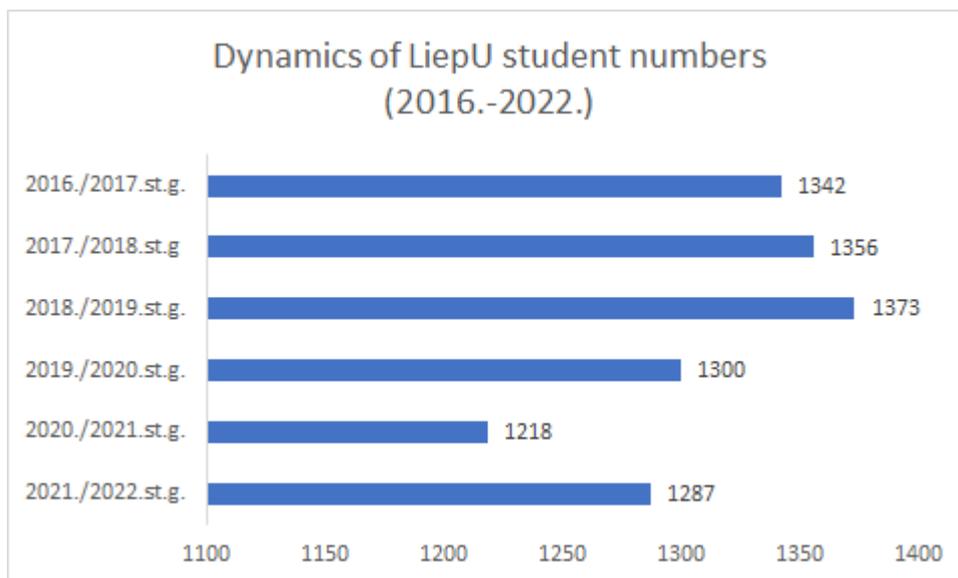
- Professional bachelor study programme “Social Worker”
- Professional master study programme “Social Work”

*Study Direction “Environmental protection”*

- Professional bachelor study programme “Environmental Innovation Technologies”
- Professional master study programme “Ecotechnologies”

The number of students at Liepaja University has decreased and now is 1287. The decrease of the student number is mainly related to the demographic and economic situation (the number of fee students and full-time foreign students has significantly decreased since the establishment of restrictions related to COVID-19 pandemic).

Dynamics of LiepU student numbers:



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

**The main decision-making bodies of the University are:**

- Council;
- Senate;
- Rector;
- Constitutional Assembly;

- Academic Arbitration Court.

**The Council** is the University's supreme decision-making body of peers, responsible for the University's sustainable growth, for strategic and financial oversight, and for ensuring that the University operates in accordance with the objectives set out in its development strategy. The Council protects the autonomy of the University, and respects and promotes the academic freedom of its academic staff and students.

The University Council consists of seven members, of whom: three are nominated by the Senate in accordance with the approved procedure; one—a person of eminence in the field who is not involved in the work of the University—is nominated by the President of Latvia; three representatives of the public are selected by the ministry under whose supervision the University is and nominated by the Cabinet of Ministers, in accordance with the procedure established by the Cabinet of Ministers, involving the public in the selection process (including alumni organisations, industry associations and employers, representatives of academic, research, and creative organisations, persons with internationally significant achievements in science, arts, or business, representatives of sector ministries, and local governments).

The selection, nomination, election, and dismissal of the members of the Council is governed by the procedures approved by the Senate.

#### **Council:**

- approves the Constitution of the University and its amendments, and submits them to the Constitutional Assembly for approval;
- approves the University's development strategy, and monitors the progress of its implementation;
- approves the University's budget, financial plan, and annual accounts;
- oversees the functioning of the cooperation and funding agreement between the University and the government;
- oversees the functioning of the internal control and risk management systems, reviews their adequacy and operational effectiveness;
- approves policies defining the University's governance processes, and the general principles, on which they operate.
- If proposed by the rector to do so, the Council decides on: the structure of the University; the establishment, reorganisation, and dissolution of the University's departments; the establishment and dissolution of branches and institutions of the University; the participation of the University in companies, foundations, and associations; the University staff remuneration policy; the promotion of investments; the University loan liabilities; the University real estate development plan; the appointment of the University auditor.
- the approval of the rules governing the election of the rector;
- the nomination of one or more candidates for election as the rector by the Constitutional Assembly;
- the rector's duties and remuneration; the Council signs the rector's employment contract and reviews the rector's performance;
- may propose the removal of the rector from office, and decides on the removal of the rector from office.

**The Senate** is the highest academic executive body of peers at the University, and is in charge of ensuring the excellence in and expansion of the University's educational, scientific, and creative endeavours, as well as their compliance with international standards of quality. The Senate governs the academic, creative and scientific activities of the University. The Senate protects and ensures the academic freedom of the academic staff and students of the University, as part of the

autonomy of the University.

The Senate:

- drafts the Constitution of the University and amendments to it. The Senate is responsible for ensuring that the Constitution meets the University's development needs and complies with laws and regulations;
- approves the University's study development plan, make proposals to the Council on areas of study to be developed;
- At the request of the rector, the Senate decides on: the creation, development, and shutting down of fields of study, and the establishing, development, content and shutting down of study programmes; the requirements, procedures and examinations for the award of degrees and qualifications;
- approves the University's plan for the development of scientific and artistic activities, and encourages the implementation of specific areas of scientific activity;
- sets the requirements for election to academic positions, and criteria for evaluating academic staff;
- determines the requirements and procedures associated with upholding academic integrity;
- Members of the Council are nominated by the University in the manner laid down in the Constitution;
- removes a member of the Council from office if they have lost the confidence of the Senate, broken the law, acted in a manner unworthy of the status of a member of the University Council, and failed to properly fulfil their duties;
- may propose the removal of the rector from office, and decide on the removal of the rector from office;
- provides statements and proposals concerning the strategy and budget of the University, the establishment, reorganisation, or dissolution of the University's units, as well as the plan for the development of University real estate, prior to the review of these matters by the Council;
- approves the documents regulating the internal procedures of the University, if they are not approved by the Council or the Constitutional Assembly;
- approves the statutes of the Study, Science, and General Councils;
- approves the regulations for the award of the titles of honorary doctor, emeritus professor, emeritus rector of the University;
- approves the statute of the Council Member Group;
- approve the statute of the Student Government.

The Senate decides on:

- maintaining or changing the scientific or artistic disciplines, and announcing competitions for vacant professorships in that scientific or artistic discipline;
- the necessary scientific or artistic discipline in which the vacant position of associate professor will be openly advertised, and the salary grade of the position;
- the recruitment of guest professors, guest associate professors, guest docents, or guest assistants (if such a vacancy exists) for a period of up to two years;
- the convening of the Constitutional Assembly.

The Senate consists of 25 members of the University staff, elected by secret ballot by the Constitutional Assembly for a term of three years, with a following breakdown:

- 19 representatives of the academic staff, i.e. no less than 75 per cent of all members of the Senate;
- 5 representatives of the student body, i.e. at least 20 per cent of all members of the Senate;

- The rector is a member of the Senate, in accordance with their position.

The Senate's work is governed by the rules of procedure approved by the Senate. A meeting of the Senate has a quorum if more than half of the total number of members of the Senate are present. A decision is adopted if more than half of the total number of members of the Senate have voted in favour.

**The rector** is the top official of the University, who conducts the general administrative management of the University, and represents the University without special authorisation.

The rector is elected by the Constitutional Assembly, and candidates for the position of the rector are selected by the University Council following an open international competition. The rector is elected for a term not exceeding five years, and no more than twice.

The rector:

- performs the management of the University, and is responsible for the achievement of the goals set out in the University's development strategy and for the efficient and lawful use of the University's financial resources in accordance with laws and regulations, the University's Constitution, and decisions of the Council and the Senate;
- functions as a representative of the University, carries out other activities to ensure the success of the University and represents it in cooperation with other institutions and individuals;
- issues orders within the scope of its powers;
- ensures the preparation of the University's plan for the development of studies and research and submits it to the Senate for approval;
- ensures the drafting of the University's development strategy and, with the approval of the Senate, submits it to the Council for approval;
- ensures the implementation of the University's development strategy in cooperation with the University's departments;
- appoints and dismisses vice-rectors and deans, and determines their areas of competence, powers, and responsibilities, in accordance with the objectives set out in the University's development strategy;
- is responsible for the successful implementation of the University's HR policy;
- ensures the preparation of the University's budget and, with the approval of the Senate, submits it to the Council for approval;
- is responsible for the implementation of the budget, and submits the University's annual accounts for approval to the Council;
- disposes of the funds of the University in accordance with the Council's authorisation, including taking the necessary steps pertaining to the University's credit liabilities, and the promotion of investments;
- takes decisions on the acquisition, encumbrance, or disposal of real estate, in accordance with the Council's real estate development plan;
- within the scope of their competence, is responsible for the compliance of the University's activities with the Law on Higher Education Institutions and other laws and regulations.

**The Constitutional Assembly** is the representative body of the academic and other staff, as well as the students of the University. The principles of representation of the University staff, according to which the number of members of the Constitutional Assembly of the University is determined, is laid down in the Constitution of the University. For the purpose of organising the elections to the Constitutional Assembly, a Constitutional Assembly Electoral Commission is formed from among the academic and general staff of the University and representatives of its students. The conditions and procedure for the formation of the Constitutional Assembly Electoral Commission, the number of its

members, duties, and the procedure for conducting and supervising the election process are regulated by the Statute of the Constitutional Assembly Electoral Commission. This Statute is drafted by the Senate, and approved by the Senate and the Council of the University.

### **The Constitutional Assembly:**

- approves the Constitution of the University and its amendments;
- elects the rector;
- may propose that the rector be removed from office;
- reviews the rector's report on University activities;
- elects members of the Senate from among the academic and other staff;
- may dismiss members of the Senate;
- elects the Academic Arbitration Court;
- if necessary, considers other matters relevant to the functioning of the University.

The Constitutional Assembly of the University consists of 51 members of the University staff, elected for a term of three years by public ballot at a general election, as follows:

- 31 representatives of the academic staff (60% of the representatives) ;
- 10 student representatives (20% of the representatives);
- 10 representatives of the other staff of the University (20 % of the representatives).

If the representatives elected at the Constitutional Assembly cease to work or study at the University, other representatives to the Constitutional Assembly are elected within two months from the respective group. The members of the respective group of representatives may withdraw their elected representative to the Constitutional Assembly if an application addressed to the Constitutional Assembly is signed by at least half of the members of that group.

The rector, vice-rectors, and deans who are not members of the Constitutional Assembly, may participate in the Constitutional Assembly in an advisory capacity.

- The Constitutional Assembly meets at least once a year. The Constitutional Assembly is convened if the rector or the Senate so requests.
- The functioning of the Constitutional Assembly is governed by the Statute, drawn up and approved by the Constitutional Assembly itself.

The Constitutional Assembly has a quorum if more than half of the members of the Constitutional Assembly participate in its work. A decision of the Constitutional Assembly is adopted if a majority of those present vote in favour. When electing or dismissing the rector, amending or adopting the Constitution of the University, a decision is approved if more than half of all members of the Constitutional Assembly have voted in its favour.

### **University structure**

The structure of the University is set up in accordance with the Constitution of the University. The tasks, functions, and rights of a unit of the University are determined by the statute of the unit, which is approved by the rector of the University.

For the purpose of carrying out study, scientific, organisational, economic, and maintenance work, the University establishes units which do not have the status of legal entities. The Council, based on a proposal by the rector, decides on the establishment, reorganisation, and dissolution of these units. These units have the right to open sub-accounts.

The main units are faculties (departments), and research institutes.

A faculty is created by the University by uniting departments in related fields of scientific activity, artistic creation, and study. A faculty is headed by a dean. The dean of the faculty is appointed by the rector, in consultation with the Faculty Council, for a term not exceeding five years, but no more than twice in succession. The proportion of students in the Faculty Council must not be less than 20 per cent. Student representatives in the Faculty Council are assigned by the student government of the faculty. A faculty may be formed if pooling its scientific potential results in its meeting at least the requirements of the doctoral dissertation board in the relevant scientific field or discipline.

A research institute is a unit of the University formed by the association of research personnel from one or more scientific disciplines with a view to using their scientific potential for the efficient pursuit of common research objectives. A research institute carries out research activities in one or more fields of science, organises and is responsible for the publication of research results, provides research-based academic and vocational studies in conjunction with faculties, promotes the implementation of innovations in the national economy, and the dissemination of research to the public. The activities of the institute and the election of its research staff is governed by its Statute, which is approved in accordance with the procedure laid down in the Constitution.

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

**In order to implement the overall goal and goals, the University of Liepaja uses the development and planning documents and the internal Quality Management System** (hereafter - QMS). In LiepU QMS there are the databases and procedures of the internal normative documents.

#### **Responsibility**

- LiepU management has made commitments to provide the necessary resources needed for the Quality Management System's efficient activity and its improvement.
- LiepU approves academic integrity and freedom, stands against academic fraud; supervises any intolerance and students or staff's discrimination.
- All LiepU employees are responsible for implementation, support and development of the Quality Policy, procedures and improvement, they are responsible for the quality and get involved in quality provision.
- Formulations of employees' responsibilities, rights and duties are written in job descriptions and procedures for all work functions affecting the quality of work.

#### **Planning of QMS**

- In the QMS manual LiepU has defined procedures and other documents how the requirements of the QMS are reached and how the development of the quality culture happens.
- Observance of the QMS requirements is achieved working according to the ESG-2015 and requirements stated in the QMS documentation.

- The order, in which the changes in processes and documentation are introduced, is stated in the Recordkeeping Instruction. Mechanisms for implementation of an efficient QMS provision;
  - analysis of outcomes of students and graduates' regular surveys;
  - compilation and analysis of employers and other social partners' opinions and suggestions,
  - Management Report considered in the Constitutional Assembly,
  - problem analysis in structural units.

In the development of the QMS procedures, regulations, rules and other normative documents and their execution control the activity of the representatives delegated by the LiepU Student Council is active. Students participate in the following LiepU institutions: in the LiepU Constitutional Assembly, in the LiepU Senate, in the LiepU Senate Development and Budget Commission and the LiepU Senate Academic Commission, in Councils of the Faculties, the Study Councils, Science Councils, Maintenance Councils, Library Council, Scholarship Commission, Scholarship Commission of the LiepU Senate, Loan Granting Commission, Study Direction Councils.

All LiepU employees are responsible for implementation, support and development, of the quality policy, procedure and management system and they take responsibility for the quality and get involved in quality provision.

The electronic link to the website where one can access:

- Quality Policy of the Higher Educational Establishment: <https://www.liepu.lv/en/124/quality-policy>
- Information on other binding internal laws and regulations can be found in **Appendix I.1.2.A** in the previous section.

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

1.	The higher education institution/ college has established a policy and procedures for assuring the quality of higher education.	Analysis of processes and improvements take place according to LiepU QMS (Quality Management System) system. The indicators of activity and evaluation results of various surveys are being analyzed. The data has been summarized after the end of the academic year. Detailed information in the Clause 5.
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.	LiepU QMS are procedures which regulate formation, licensing and accreditation of study programmes. Separate procedures determine preparation, approval and change management of both study courses and study plans. Procedures are created which regulate the annual study plan development of classes and their management of changes, also preparation of timetable and change management. QMS procedure S-6-I_ENG Development and licensing of study programmes in Annex

<p>3 .</p> <p>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>	<p>The evaluation of study results takes place in accordance with the "Rules on examinations of a study course/module" (approved in the Senate meeting on 23rd May 2022, protocol No.15) and "Regulation on Final examinations, State examinations and State final examinations" (approved in the Senate meeting on 25th October 2021, protocol No.3)</p> <p>Rules on examinations of a study course/module:  <a href="https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf">https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf</a></p> <p>Regulation on Final examinations, State examinations and State final examinations:  <a href="https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Regulation%20on%20final_state%20and%20state%20final%20examinations_eng.pdf">https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Regulation%20on%20final_state%20and%20state%20final%20examinations_eng.pdf</a></p>
<p>4.</p> <p>Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.</p>	<p>In 2018, three mid-term planning documents were developed, directed towards the LiepU human resources development. LiepU Human Resources Development Plan 2018-2023 in which the current situation is assessed, the goals of human resources management processes, the tasks to be executed and results achieved are determined. The goal of LiepU Human Resources Development Plan are to provide LiepU with the necessary human resources, promote development of the current human resources (academic and general staff), professional growth and development, new teaching staff and scientific staff inclusion in the university education and research process in order to provide modern, towards development orientated studies, research, life-long education in compliance with the LiepU Development Strategy. The Action Plan of LiepU Academic Staff Development 2018-2022 is the staff development and attraction plan, in which the envisaged activities of the academic staff competence improvement, development and attraction are determined and described. The goal of the Action Plan of LiepU Academic Staff Development 2018-2022 is to provide the increase of the LiepU academic staff competences and skills, promote the staff development and LiepU work development according to the quality requirements. 3.The Training Plan of LiepU Management Staff 2018-2021 in which the activities for the envisaged managerial staff competence development are stated and described. The goals of LiepU Managerial Staff Training Plan: the increase of LiepU managerial staff competences and skills for a skilful administration, process management, managerial team with a vision of a modern, competitive international university which understands global tendencies, a managerial team which is able to inspire students and employees for a fast and ambitious development. LiepU QMS has procedures about the Employees' training planning, organisation and efficiency assessment and Academic Staff selection and assessment.</p>

5.	<p>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>	<p>Every year on October 1 the data is collated about the number of students, number of the matriculated, number of graduates, number of staff- which is included and analysed in the self- assessment report of the study direction. In LiepU procedures are developed which state the order in what way the annual surveys of students' satisfaction and graduates' surveys are carried out. In the reports of the study direction self- assessments the compliance of the study direction and study programmes with the labour market demand, the annual employers' surveys are analysed. In the study direction self-assessment reports the information on financial resources for the study direction in order to implement the corresponding study programmes are analysed, also to provide the academic staff research (creative) activities. Every year in the Senate the enrolment results are analysed, assessment of the Scientific activity and analysis of financial and economic activity are carried out.</p>
6.	<p>The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing their quality assurance systems.</p>	<p>Internal quality on the faculty and study direction level is provided by the Faculty council, Council of Study Direction and director of the study direction, director of the study programme.</p> <p>In the framework of the study programme the internal quality is provided by the director of a study programme and the involved academic staff of study programmes. In order to make a continuous development of study programmes, LiepU Council of Study direction monitors the study direction and is responsible for the content and the quality of study programmes' study direction. In the Council of Study direction compulsory have to be the representatives of employers. The Council of Study direction acts in accordance with "Regulation on Liepaja University Councils of Study directions" (approved in LiepU Senate on 17.06.2019., protocol No.2).</p> <p>Functions of the Study council are: ((1) to organize and monitor the development of study programmes of the study direction; to submit study programmes in the Faculty council; (2) to coordinate and promote interdisciplinarity and cooperation with employers in the development of study programme(-s); (3) to promote research-based studies; (4) to supervise the implementation of study programmes of the study direction; (5) to review and accept the annual self- assessment report of the study direction, to submit it to the Faculty council; (6) to evaluate problems of the study process and to prepare proposals for the problem-solving.</p>

## 2.1. Management of the Study Field

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

The overall aim of the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science is to provide students with the opportunity to acquire quality academic and vocational education in information technology, computer engineering, electronics, telecommunications, computer management, and computer science programmes, including interdisciplinary study programmes, making it possible for them to prepare for independent, creative, interdisciplinary research and professional activities.

The programmes of the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science are implemented by the LiepU Faculty of Science and Engineering (FSE). The development strategy of the field of study is aligned with the strategic planning documents of FSE and LiepU, including the LiepU Development Strategy (2016-2020) (extended until 2023)[1].

LiepU is a centre for higher education, science and culture in the Kurzeme region, contributing to the development of the region in the Latvian and international context. Its mission is to be a promoter of education, science, innovation and cultural development of Liepaja and Kurzeme, which provides competitive, nationally and internationally significant studies necessary for the development of the region, implements study-related, nationally and internationally recognised research, and promotes sustainable growth of society. Its main goal is to provide research-based, high-quality higher professional, academic and lifelong learning opportunities that are relevant to the region and competitive in Latvia and internationally, promoting the development of a knowledge-based and professional competence-based economy, and promoting a creative, culture-focused society.

Strategic directions for the University's development:

- 1) Excellence in education and governance for sustainable human capital capacity and quality of life;
- 2) Language, culture, and new media arts in the context of regional, ecological, and socio-economic sustainability;
- 3) Computer, information, and environmental technologies for sustainable growth.

Goals of the Faculty of Science and Engineering of Liepaja University[2]:

- provide a supportive and creative environment for quality, innovation-driven higher vocational and/or academic education in science and engineering;
- ensure the stabilisation of the faculty's scientific potential and the achievement of quantitative and qualitative indicators in line with the university's criteria, systematically promoting growth among its academic staff;
- strengthen the fields of study managed by the faculty, ensuring the quality of the study programmes, increasing the number of students, and offering new study programmes in international and national demand;

- boost the public visibility of the faculty's activities and results through targeted planning and implementation of a system of marketing activities.

The development strategy is based on the higher education guidelines in the context of international, national and regional specialisation; job market demand for specialists in Latvia and Kurzeme; achievement of international quality indicators for higher education; results of the evaluation and previous accreditation of the field of study; expert recommendations and related conclusions. There are four main directions for the strategic development of the field of study:

- the quality of the study programmes;
- the scientific and professional teaching qualifications of the teaching staff
- the quality of the study environment (infrastructure, equipment and information infrastructure, availability of financial resources);
- the sustainability of the field (relevance to the changing requirements of the job market, cooperation with partners,
- student satisfaction, etc.).

The development of the study programme is influenced by trends in the development and digitisation of the global society. ICT products are playing an increasingly important role in the economy, in global, national and regional affairs, in education, in society and in the daily lives of individuals. Long-term forecasts point to a growing demand for professionals who can create, maintain, and use digital products and services. According to the European Commission's 2020 Professional Shortage and Surplus Analysis report, app developers, software developers, and web and multimedia content developers are categorised as occupations with large shortages and these shortages have not shown a downward trend in the last 5 years.

According to the statistics compiled by the Latvian Information and Communication Technology Association (LIKTA) ([likta.lv](http://likta.lv)), as of December 2021, there were more than 7050 information and communication technology (ICT) companies operating in Latvia and 38.4 thousand specialists were employed in the ICT sector. The ICT sector is one of the most export-intensive sectors of the economy (in 2021, 53% of the ICT industry turnover was exports). However, ICT companies point at the lack of ICT professionals as a factor holding the sector back. For example, in 2021, some 1200 new IT specialists received their diplomas, but, according to LIKTA president Signe Bāliņa, forecasts of various ICT companies show that they were ready to hire at least 1000 new employees per year, or more than three thousand over the next 3 years. (<https://digitalanedela.lv/presei/jau-treso-gadu-notiks-ikt-karjeras-dienas/>).

According to the information gathered by the Liepāja Digital Innovation Park, at the beginning of 2022 there were 84 ICT companies operating in Liepāja. Some of them, together with the Liepāja University and organisations (foundations and associations) interested in the development of ICT and ICT industry, created the Liepāja Technology Cluster in 2020, aiming to promote IT skills at all levels among different social groups, to attract highly qualified specialists, to raise public awareness about technology topics and the development of the IT ecosystem in Liepāja. At various meetings and seminars, representatives of ICT companies working in Liepāja have also mentioned software projects that were rejected due to lack of IT specialists.

Five study programmes (3 bachelor, 1 master, and 1 doctoral programme) are taught in Latvian and English:

- vocational bachelor study programme in Information Technologies (duration of studies: 4 years);
- academic bachelor study programme in Computer Science (duration of studies: 3 years);
- vocational bachelor study programme Smart Technologies and Mechatronics (duration of

studies: 4 years);

- vocational master study programme in Information Technologies (duration of studies: 2 or 3 years (depending on the bachelor degree previously obtained));
- doctoral programme in E-Learning Technologies and Governance (duration: 4 years).

The study programmes are closely linked with one another in terms of content and use of resources. The bachelor degree programmes include a number of shared core courses in general education and IT, which students of the different programmes take together. Study projects and their tasks are designed in such a way that they can involve teams of students from different study programmes. The Faculty of Science and Engineering has defined three main sub-activity fields within the Computer, Information and Environmental Technologies for Sustainable Development strategic specialisation field at LiepU—Artificial Intelligence and Machine Learning, Internet of Things and Renewable Energy—which has led to the inclusion of several study courses and modules in the bachelor and master study programmes, including programming, smart technologies, applications of artificial intelligence, machine learning, data processing and analysis, robots and Internet of Things. The shared and similar content of the courses and modules enables the joint use of specialised study laboratories.

The content of the master study programme also follows the main fields of the faculty's strategic specialisation. The Artificial Intelligence and Smart Technologies modules provide bachelor students with the opportunity to deepen and broaden their knowledge and skills in one of these specialisations. The content of the master programme is tailored to the graduates of all three bachelor programmes. The content and tasks of the study projects make it possible for master students to be a part of a project team, taking the role of lead professionals together with undergraduate students.

The doctoral programme in E-Learning Technologies and Governance is implemented jointly with Riga Technical University (RTU). The programme participants actively follow the development of the priorities and fields of activity of the European framework programmes, and update the research fields of the doctoral programme accordingly. The programme will equip young PhDs with the skills to work on an international level, to conduct research in the field of technologies related to the society of knowledge, and to bring new knowledge into education. They will bring new knowledge for the implementation of e-learning technologies in businesses and the lifelong learning system. E-learning technologies have been developing rapidly for more than 20 years. While twenty years ago the dominant challenge was to translate traditional educational methods into the digital environment, today, the main problems are related to the educational models of the digital age. In the last decade, new educational technologies and new research areas have emerged, with MOOCs, learning analytics, artificial intelligence, virtual reality, blockchain. The COVID-19 pandemic gave a powerful push to the development of e-learning technologies. At the same time, decisions on digital solutions made in the COVID-19 context were rapid and political, and not sufficiently informed by e-learning technology researchers. Researchers are currently working to interpret and generalise the educational experience of the COVID-19 period. Rapid developments are expected in the future as a coherent education model continues to be developed for the digital age. The uniqueness of the programme lies in the interdisciplinary and transdisciplinary research in different educational situations. The level of technological development and the diversity of scientific challenges create the demand and opportunities for PhD students with different educational backgrounds.

[1] [https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja\\_University\\_Development\\_Strategy\\_Summary\\_2016-2023\\_25.01.2021.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja_University_Development_Strategy_Summary_2016-2023_25.01.2021.pdf)

[2] <https://www.liepu.lv/en/120/faculty-of-science-and-engineering>

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

The development of information technology studies highlights priority areas of activity, the implementation of which is aimed at sustainable growth, taking into account the current developments in higher education policy, expert recommendations and the results of the analysis of proposals by FSE staff and students:

1. Skilled and sustainable academic staff who meet the objectives and requirements of the field of study, programmes, and courses
2. Research activity by academic staff and students
3. Improving the content of study programmes and meeting student needs
4. Technical infrastructure of the field of study

The priority areas are linked to the groups of criteria for evaluating the fields of study and programmes (quality, resources, sustainability and cooperation). The tasks corresponding to the priority areas of activity are also included in the annual work plans of LiepU and FSE.

The development plan was prepared by a working group in which study program directors and leading academic staff members of the Faculty of Science and Engineering (FSE) participated. It was presented and discussed at the meeting of FSE staff members. It was approved by FSE Council.

The field of study development plan is enclosed in the attached file **AttistibasPlansEN.pdf** .

To support the implementation of the fields of study, stakeholder communication is carried out in the form of student questionnaires, feedback from internship providers, employers and graduates, discussions among faculty members involved in the teaching of the field of study, and annual discussions with the students of the field of study. Results of the SWOT analysis:

**Strengths of the field of study:**

- The information technology sector has been identified as one of Latvia's national priorities;
- The study programmes are in line with EU programmes and international recommendations;
- The equipment infrastructure is adequate for the training of IT specialists and for the work of researchers; modern technical support for programmes, communications, software, and classrooms guarantees quality teaching of study programmes
- The close cooperation between FSE and ISIT, and the involvement of instructors and students in projects form the basis for research-based studies;
- Involvement of IT professionals and employers in the study process (guest lectures, participation in bachelor and master thesis commissions, internships, applied research projects, etc.);
- The relatively small number of students in academic groups and motivated students are the basis for an individualised approach to the study process and for ensuring the quality of the studies;
- A wide choice of online courses for individual learning and communication with instructors

- Cooperation with students: Professor Edvīns Ģingulis Mathematics and Physics Competition, Liepāja Open Programming Competition, Robot Programming Competition for Schoolchildren, Tech Afternoons, Career Days, etc.
- Cooperation with computer, maths and physics school teachers through seminars, teacher in-service training, programming competition for teachers, etc.

#### **Weaknesses of the field of study:**

- The students are in high demand on the job market, with many students working alongside their studies, which extends their average study time;
- Relatively high proportion of drop-outs;
- Relatively low activity of instructors in producing publications;
- Lack of resources to motivate young scientists for academic and scientific work;
- Lack of resources to engage experienced IT professionals in academic work;
- Insufficient number of instructors to provide students with in-depth training in specialised courses in the field;
- Low number of foreign guest instructors involved in the study programmes;
- Gaps in the purchasing and updating of computer hardware and specialised laboratory equipment;
- Low number of students in all study programmes;
- Insufficient student exchange activities with universities abroad;
- Insufficient internships of instructors at universities abroad;

#### **Opportunities of the field of study**

- Significant increase in the number of international students (*that is one of the way to increase the university's own income, which can be directed to the development of the study direction - improvements to the study infrastructure, replenishment of the library's stock, attracting additional guest lecturers, etc.*);
- Information technology specialisations are in demand on the job market (STEM, smart specialisation); *it facilitates and expands the opportunities to involve more experienced IT industry experts in the study process - providing guest lectures, master classes, practice, etc.*;
- Development of international cooperation, using existing contacts with universities and research centres abroad, and establishing new ones; *it expands opportunities for student and teaching staff exchange trips, increases the number of foreign guest lecturers, extends opportunities to implement study development and research projects*;
- Master graduates and doctoral students are promising IT professionals whose potential can be used to develop the field of study; *FSE offers to these new IT specialists the opportunity to participate in study programs as teaching staff, thus relieving the university's current leading academic staff.*
- European structural funds and other support for doctoral students to work on their theses. *That both expands the possibilities of publishing research results of doctoral students, and motivates and provides opportunities them to focus their creative activities on the research of a doctoral thesis, thus decreasing time for receiving a doctor degree. As a result, the university will expand its opportunities to involve more doctors in the study process and research projects, increasing their proportion in the university's academic staff.*
- European structural fund and other projects to improve the study process and to support research;
- Involvement of IT professionals and employers in the study process (guest lectures, participation in bachelor and master thesis commissions, internships, applied research projects, etc.);

- Involvement of foreign instructors and IT professionals in the study process

### **Threats to the field of study:**

- Working students and inability to combine work and studies (mainly in the final year). *The risk can be partially mitigated by the use of the e-learning environment Moodle and other remote and student self-directed study support tools, as well as students' individual consultations by the academic staff (admittedly, this possibility is very limited).*
- For some instructors, there is less direct contact with the industry, i.e. at least part-time work in ICT companies, which can result in a disconnect between theory and real life. *Workshops organized by FSE, in which IT professionals, students, and faculty members participate, and seminars with the participation of representatives of IT companies, reduce this risk.*
- There are many study programmes in Latvia that train specialists in computing. *In the conditions of such competition, the university has clarified its study offer - smart technologies. Specialists of IT companies working in Liepāja are involved in the promotion of study programs.*
- Demographics will lead to a rapid decline in the number of students in Latvia, which will mean either a reduction in the number of students with a corresponding reduction in funding, or a further divergence in students' abilities and level of preparation, requiring a rearrangement of the programmes and approaches to teaching. *As possible solutions in the case of the realization of these threats, the faculty has determined and analyzed the wider implementation of e-learning solutions in the study process, the merging of Latvian and English students into joint groups in at least some courses.*
- Lack of funding and the country's overall weak economic situation. *A significant increase in the number of foreign students and intensive attraction of applied research projects would at least partially compensate for the lack of funds for the development of study programs.*
- Reduced national budget funding for the Latvian education system, one of the lowest in the EU, in absolute and relative terms;
- Further cuts in higher education funding could seriously undermine the quality of the programmes;
- Uncertainties caused by the ongoing reform of the country's universities;
- LiepU status as a university of applied sciences poses a risk to the availability of resources for studies and research projects;
- Uncertainty about the status of LiepU risks lowering its prestige and consequently reducing the number of potential students;
- Insufficient public funding for higher education, including for study infrastructure;
- Public perception of education in Latvia having low quality;

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

The study programmes are implemented by the Faculty of Science and Engineering (FSE).

The Faculty of Science and Engineering was established on 2 September 2013 (LiepU Order No35-v

'On the Reorganisation of the Faculty' of 2 September 2013). The faculty operates in accordance with the Faculty Statute and LiepU strategic planning documents.

The teaching of the field of study is managed by the heads of the study programmes together with the heads of the field of study, its dean, methodologist, clerk, and secretary (see Table 2.1.3.1.)

The dean's office is responsible for the circulation of information within the faculty. The Faculty Council and teaching staff meetings take place once a month. The fields of study under the supervision of the faculty are evaluated and monitored at the meetings of the Faculty Council, at the general meetings of the faculty, and in the work groups of the teaching staff in the field of study.

Research-based studies are handled by the FSE in cooperation with the Institute of Science and Innovative Technologies (ISIT).

To enable the study process, the faculty manages 10 laboratories, 11 subject-specific classrooms, and 11 computer classrooms. 8 laboratories are located at Lielā iela 14, and 2 at Kr. Valdemāra iela 4).

Laboratories:

- Computer Network and System Laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping Laboratory (Lielā iela 14, Room 004),
- Paper Recycling Laboratory (Lielā iela 14, Room 003),
- Physics and Mechatronics Laboratory (Lielā iela 14, Room 430),
- Environmental Technology Laboratory (Lielā iela 14, Room 407),
- Environmental Chemistry Laboratory (Lielā iela 14, Room 407),
- High Performance Computing Laboratory (Lielā iela 14, ),
- Smart Technologies Laboratory (Lielā iela 14, Room 427),
- Biogas Laboratory (Kr. Valdemāra iela 4),
- Nanotechnology Laboratory (Kr. Valdemāra iela 4).

Subject-specific rooms (Lielā iela):

- Software Engineering Room (with 18 computer workstations; Room 415),
- Computer Science and Computer Management Room (with 13 computer workstations; Room 416),
- Programming Room (with 20 computer workstations; Room 437),
- Programming Room (with 18 computer workstations; Room 434),
- Mathematics Room (with 13 computer workstations; Room 426),
- Computer Graphics Room (with 13 computer workstations; Room 337),
- Videoconferencing Room (with 9 computer workstations, Room 426a),
- Computer Room (with 18 computer workstations; Room 343),
- Computer Room (with 12 computer workstations, Room 402)
- Nature Embassy (Room 403),
- [Circular Economy Centre](#) (Room 003),
- Environmental Biology Room (Room 412).

These are supervised by the support staff: LiepU IT Centre and 3 laboratory assistants in chemistry, physics, and nature sciences.

For a brief description of the units involved in the implementation of the study programmes, see Table 2.1.3.2.

The faculty includes 2 fields of study, 3 education subject groups, and 3 branches of science, implementing 8 study programmes in Latvian and 4 study programmes in English (winter and summer admissions).

Fields of study:

1. information technology, computer equipment, electronics, telecommunications, computer control, computer science Reaccredited until 31 December 2023.
2. Environmental protection. Reaccredited until 31 December 2023.

Education subject group:

1. Natural sciences, maths and IT
2. Engineering and technology

Scientific fields:

Natural Sciences (1):

- 1.1. Mathematics
- 1.2. Computer Science
- 1.3. Physics and Astronomy
- 1.5. Earth Sciences, Physical Geography and Environmental Sciences (nature conservation)

Engineering and Technology (2):

- 2.2. Electrical Engineering, Electronics, Information and Communication Technologies
- 2.7. Environmental Engineering and Energy
- 2.8. Environmental Biotechnology

Social sciences (5):

- 5.2. Economy and Business
- 5.7. Social and Economic Geography

FSE's teaching staff cover 4 teaching areas:

- Environmental sciences
- Mathematical sciences,
- Engineering sciences,
- information technology.

Table 2.1.3.1.

### **FSE structure description**

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<b>Unit</b>	<b>Person responsible</b>	<b>Challenges in implementing the study programme</b>
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Dean's office	Dean	<p>Human resources management: plans and coordinates academic staff workloads; organises employment contracts with teaching staff; organises evaluation of teaching staff and collects the results of the surveys; organises teaching staff meetings at least once a month; informs teaching staff about the processes and activities taking place at the university.</p> <p>Study process management: organises the preparation of licensing and accreditation documents; organises the development of study plans, including annual ones; organises the development and improvement of relevant study courses; coordinates the compatibility of the content and scope of study courses; supervises the preparation of self-assessment reports for study programmes; evaluates applications for final theses in cooperation with heads of programmes; supervises the organising of final examinations and graduations; supervises the organising and evaluation of internships; monitors the classes taking place at the faculty; monitors student academic performance.</p> <p>Science management: oversees the activity and quality of the faculty's doctoral study programmes; supervises and coordinates the improvement of the scientific qualifications of the faculty members in the relevant field; supervises the scientific research activities of the faculty members in cooperation with the heads of the scientific fields (sub-fields); supervises and coordinates the participation of the faculty in scientific and applied research projects; coordinates the planning and preparation of scientific conferences and seminars; coordinates the planning of scientific and educational publications, and analyses the implementation of the plan; supervises and coordinates the scientific activities of students in the relevant field; coordinates popular scientific events at the faculty (in the relevant field); provides information about the organisational matters of the study process to students; cooperates with parents of academic group students.</p>
	Methodologist	
	Secretary	<p>Information-related cooperation with students and faculty, including guest instructors. Arranges internships, preparing internship timetables and contracts, filing internships in the database, collecting and storing internship documentation. Compiles study programme licensing and accreditation documents. Prepares annual and template study plans, preparing documents on teaching staff workloads. Processes and stores submissions of theses, thesis topics, etc. Cooperates with other LiepU departments, etc.</p>

	Administrative assistant	<p>Manages and works (maintaining, organising, and preparing) with documents related to the research of the faculty members and the doctoral programme. Participates in the organising of faculty events (scientific conferences, seminars, guest lectures, popular science events, etc.). Participates in faculty-related projects, looks for opportunities for involvement in new projects, keeps relevant documentation.</p> <p>Participates in the management and preparation of budget documentation and other duties as assigned by the immediate supervisor.</p>
	Laboratory assistant	<p>Assists in the preparation of various educational and teaching materials, according to the specific features of the work; assists in the preparation of project documentation, according to the specific features of the work; organises and maintains study project documentation; assists teaching staff and students when necessary; installs/removes equipment necessary for the teaching of study courses as instructed by teaching staff; provide information about the progress of and changes in the study process (on issues related to the performance of work duties);</p> <p>Posts information about the faculty on the faculty's website and social media accounts. Coordinates the flow of information within the scope of their competence between the staff, students, and management through various channels; participates in the preparation and organising of conferences, seminars, etc. arranged by the faculty, as instructed by the dean; organises the buying and use of departmental equipment and physical assets; other duties appropriate to the position, in accordance with the instructions of the immediate supervisor.</p>
Support staff, physics laboratory, environmental chemistry laboratory, science rooms	Laboratory assistant	Provides students with the necessary equipment for practical training and laboratory work.
Faculty Council	Chairman	<p>The Faculty Council is the supreme decision-making body of the faculty, which considers and decides on matters pertaining to the organising of studies, academic, and scientific work, as well as economic, financial, and other affairs of the faculty.</p> <p>See Faculty Statute</p>

Field of study	Head of the field of study	The head of the field of study supervises the development, accreditation, and implementation of research-based academic and vocational study programmes within the same thematic group of education. The head of the study programme works under the supervision of the dean. The rector issues orders to appoint the heads of the fields of study. See Regulations on Heads of Fields of Study and Study Programmes.
Study programme	Head of programme	Prepares the study programme for accreditation. Coordinates the work of academic staff and guest instructors involved in the implementation of the study programme; discusses the content of the study programme and issues related to the implementation of the programme at meetings of the teaching staff; handles other issues related to the organising of studies. See Regulations on Heads of Fields of Study and Study Programmes.

Table 2.1.3.2.

### Description of the units involved in the implementation of the study programme

Unit	Person responsible	Challenges in implementing the study programme
Institute of Science and Innovative Technologies (ISIT)	Head of institute	Creates opportunities for instructors and students to carry out scientific research
Library	Head of library	Provides students and teaching staff with educational literature, databases (LETA, LURSOFT, NAIS, EBSCO, Letonika online, CD- ROM ( <i>Unesco Key data on Education, Encyclopedia Britannica</i> ), etc., enabling access to and retrieval of information from all over the world)
International Relations Division	Senior specialist for international cooperation, senior advisor, rapporteur	Enable student mobility, work with full-time international students
Study Division	Methodologists	Ensure the filing of study programmes and plans in the LAIS system and the preparation of diplomas for students
	Planner	Develops lesson plans

Information Technology Centre	Information Technology Centre staff	Provide the computer equipment necessary for the study process, make it possible to work with free-access computers, handle the copying of materials, etc.
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**2.1.4. Description and assessment of the requirements and the system for the admission of students by specifying, inter alia, the regulatory framework of the admission procedures and requirements. The assessment of options for the students to have their study period, professional experience, and the previously acquired formal and non-formal education recognised within the study field by providing specific examples of the application of these procedures.**

The LiepU Admissions Rules for each academic year are approved by the Senate and are available to everyone on the LiepU website, for example:

- Admissions Rules for the 2022/2023 academic year:  
[https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas%20noteikumi\\_pamats\\_tudijas\\_2022\\_2023.studiju%20gadam.pdf](https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas%20noteikumi_pamats_tudijas_2022_2023.studiju%20gadam.pdf) (Latvian on;ly)
- Master's degree programme admissions rules for the 2022/2023 academic year:  
[https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas%20noteikumi\\_magistr\\_antura%202022.\\_2023.studiju%20gadam.pdf](https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas%20noteikumi_magistr_antura%202022._2023.studiju%20gadam.pdf) (Latvian on;ly)
- Doctoral degree programme admissions rules for the 2022/2023 academic year:  
[https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas\\_noteikumi\\_doktorantu\\_ra\\_2022\\_ziemas\\_un\\_vasaras\\_uznemsana.pdf](https://www.liepu.lv/uploads/dokumenti/uznemsana/2223/Uznemsanas_noteikumi_doktorantu_ra_2022_ziemas_un_vasaras_uznemsana.pdf) (Latvian only)
- Procedures for enrolling foreigners in Liepaja University:  
[https://www.liepu.lv/uploads/files/Kartiba%20arzemnieku%20uznemsanai%20LiepU\\_eng.doc](https://www.liepu.lv/uploads/files/Kartiba%20arzemnieku%20uznemsanai%20LiepU_eng.doc)

The admissions rules describe the compulsory and additional requirements for the study programmes: CE (centralised examination) or STIP (examination by an international institution, in a foreign language), GA (final grade), VE/I (state examination or record) in a specific subject, and the admissions examinations.

Procedures regulating the technical admission process have been developed for the LiepU Quality Management System (QMS):

- The Single Application for Undergraduate Studies, which governs the admission process for undergraduate students via the e-service [www.latvija.lv/studijas](http://www.latvija.lv/studijas).
- The inclusion of the person in the list of Year 1 students, which governs the admissions to master programmes and additional admissions.

The regulations of the commission for the recognition of competences acquired outside formal education or through professional experience, and study results achieved in prior education of the Liepaja University are available in electronic format at: [https://www.liepu.lv/uploads/dokumenti/Regulations%20for%20recognition%20of%20competences\\_acquired.\\_or\\_professional\\_experience\\_achieved\\_study\\_results\\_recognition.pdf](https://www.liepu.lv/uploads/dokumenti/Regulations%20for%20recognition%20of%20competences_acquired._or_professional_experience_achieved_study_results_recognition.pdf)

The admissions requirements and admissions examinations for study programmes are provided on the LiepU website:

- Vocational bachelor study programme in Information Technology (in Latvian):

<https://www.liepu.lv/lv/759/informacijas-tehnologija>

- Vocational bachelor study programme in Information Technology (in English):  
<https://www.liepu.lv/en/49/information-technology>
- Academic bachelor study programme in Computer Science (in English):  
<https://www.liepu.lv/en/48/computer-sciences>
- Vocational bachelor study programme in Smart Technologies and Mechatronics (in Latvian):  
<https://www.liepu.lv/lv/1267/viedas-tehnologijas-un-mehatronika>
- Vocational bachelor study programme in Smart Technologies and Mechatronics (in English):  
<https://www.liepu.lv/en/174/smart-technologies-and-mechatronics>
- Vocational master study programme in Information Technology (in Latvian):  
<https://www.liepu.lv/lv/592/informacijas-tehnologija>
- Vocational master study programme in Information Technology (in English):  
<https://www.liepu.lv/en/51/information-technology>
- Doctoral programme in E-Learning Technologies and Governance (in Latvian):  
<https://www.liepu.lv/lv/280/estudiju-tehnologijas-un-parvaldiba>
- Doctoral programme in E-Learning Technologies and Governance (in Latvian):  
<https://www.liepu.lv/en/112/e-study-technologies-and-management>

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

At the start of the bachelor and master degree programmes, the head of the programme or their delegated representative of the dean's office acquaints the students with the programme requirements and resources. This is also one of the objectives of the course Introduction to Studies, Technology, and Research (2 credits in semester 1) included in the bachelor degree programme. When starting a new course of study, the instructor of the course acquaints the students with the requirements for successful completion of the course and for gaining credits. A description of each course with its requirements is also published on the course page in the e-learning environment Moodle.

The instructors monitor and evaluate the study activity using various forms and methods, such as seminars, unsupervised work, tests, solving of problems, practical games, presentations of research and study projects, defence of study projects, etc. Each course has intermediate tests, the number and content of which are determined by the course instructor, and a written final test (exam). For each test, the course instructor can choose the weighting to be used for the final mark. The assessment methods chosen by the instructor depend on the specifics of the course and the requirements set in the course descriptions. During the study process, instructors use methods, forms of examination and evaluation criteria that are appropriate to the aim of the studies, and the expected study results. Students receive support and feedback from instructors during their studies. Assessment criteria for each individual course are available in the corresponding Moodle course ([studijas.liepu.lv](https://studijas.liepu.lv)). The course instructor introduces students to the assessment criteria in the first lessons of the course. Evaluations give students the opportunity to demonstrate the extent, to which they have achieved the expected learning outcomes.

The regulations on course and module examinations, published on the LiepU website at [https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course\\_Module%20Exa](https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Exa)

[minations.pdf](#) , define the procedure for organising and conducting examinations, which also stipulates the principle of achieving and evaluating results.

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

The principles of academic integrity at the University are regulated by the Liepaja University Code of Academic Integrity, approved at the Liepaja University Senate online meeting of 14 December 2020, Minutes No 6). Its rules and procedures governing academic integrity and ethical principles that must be integrated in the study process in higher education were developed as part of the project 'Better Governance at Liepaja University' (CDM No 8.2.3.0/18/A/017). The Code is published on the LiepU website:

[https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/LiepU%20Akademiska%20godigu%20kodekss\\_eng.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/LiepU%20Akademiska%20godigu%20kodekss_eng.pdf)

To detect plagiarism in the final theses of students, LiepU uses a single computer-based plagiarism control system maintained by the University of Latvia. The inter-university communication events have led to the conclusion that Latvian universities should cooperate in the field of academic integrity, with a single system used to check for plagiarism, a clear definition of plagiarism, and standardised punishments if plagiarism is detected. This calls for improvements in the prevention work of universities, educating students, teachers and researchers in this area.

In the study programmes of the field of study, all final theses prepared by the students are checked using the inter-university single computer-based plagiarism control system after their submission in PDF format in the LAIS system. During the self-assessment review period, no plagiarism was detected in the works of students in the field of study. In cases where the results of the computer-assisted verification of a submitted work have shown increased textual consistency with other sources, FSE experts were brought in to carry out an in-depth examination of the work. The most common reason for such text matches was found to be that students include software documentation in the annexes, using standardised forms and document templates.

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

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

In 2016, the Senate approved the Development Strategy of Liepaja University for 2016–2020. The strategy defines the main goal of LiepU: to provide research-based, necessary for the region, nationally and internationally competitive and high-quality opportunities for higher vocational and

academic education, and lifelong learning, promoting the development of an economy based on knowledge and professional competences, and strengthening a creative, culture-oriented society. The strategy sets study and lifelong learning development goals, scientific activity, research and innovation development goals, human resources management goals, financial management goals, and project management goals, with performance indicators.

In order to ensure the fulfilment of the principal goal and objectives, LiepU must take into account external requirements for quality assurance and the views of its partners and stakeholders.

In order to implement the principal goal and objectives, LiepU uses development and planning documents, and an internal quality management system (QMS).

The QMS of Liepaja University has procedures that regulate the creation, licensing, and accreditation of study programmes. Based on the changes in the accreditation of study programmes/programmes, a foundation of regulations (procedures, rules) was developed to support the introduction of new study programmes and programmes. Separate procedures govern the preparation, approval, and change management of courses and study plans. Procedures are in place to govern the creation and management of changes to annual study plans, and the preparation and management of changes to timetables.

The LiepU QMS system has established procedures that regulate the study process, with the admissions, study progress, internships, ERASMUS+ exchange opportunities, final/national examinations. Procedures are in place for the evaluation of the teaching staff, the general student satisfaction survey, and for identifying the views of graduates and employers.

The system also describes the procedures that support the study process, with HR management, financial management, IT, library, and economic resource management, document management, project management, information management and public information management, as well as scientific and research management processes.

The activity of representatives nominated by the Liepaja University Student Council is in the development of regulations, rules, and other regulatory documents, and in the monitoring of their implementation. Students were active in the following LiepU institutions: LiepU Constitutional Assembly, LiepU Senate, Faculty Councils, Study Council, Science Council, Library Council, Scholarship Award Commission, LiepU Senate Scholarship Award Commission, Loan Award Commission, Study Programme Councils.

All LiepU employees are responsible for the implementation, maintenance, and improvement of the Quality Policy, Procedures and Management System; they are responsible for quality, and are involved in quality assurance. The responsibilities, rights, and obligations of the staff are specified in the job descriptions and procedures, for all job functions that affect the quality of their work.

The quality assurance of study programmes is carried out in accordance with the quality management system of the University, which is based on European quality assurance guidelines and standards. To ensure the quality of each study programme and its monitoring, study programme councils are organised regularly, where heads of the study programmes, in cooperation with programme staff, students, graduates, and employers, carry out programme evaluations. The views of all stakeholders are taken into account, thus contributing to the development of the study programmes in line with the requirements of professionals, and the job market, as well as the insights of students and the experience of graduates when starting or continuing their career growth.

The LiepU regulatory documents and QMS procedures prescribe continuous improvement, development, and efficiency of the field of study. Self-assessment reports for fields of study must include a development plan and an analysis of its implementation.

For opportunities and financial guarantees in the continuation of studies in the event of the dissolution or reorganisation of a study programme or other changes, see 2.2.1.1 Table.

#### 2.2.1.1. Table

## Opportunities for continued studies and financial guarantees

Study programme	Continuing studies at university (study programme)
Computer Science	Latvia University of Life Sciences and Technologies, academic bachelor study programme in Computer Management and Computer Science
Information Technology (bachelor)	Latvia University of Life Sciences and Technologies, vocational bachelor study programme in Information Technologies for Sustainable Growth;
Smart Technologies and Mechatronics	Rēzekne Academy of Technologies, vocational bachelor study programme in Mechatronics Vidzeme University of Applied Sciences, vocational bachelor study programme in Mechatronics
Information Technology (master)	Latvia University of Life Sciences and Technologies, master study programme in Information Technologies
E-learning technologies and governance	Latvia University of Life Sciences and Technologies, doctoral programme in Information Technologies

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

The development and the supervision of the implementation of the study programmes is organised by the Field of Study Council. It consists of the dean of FSE, the head of the field of study, the heads of the study programmes, academic staff representatives, students (at least one student from each study programme of the field of study), and employer representatives. One of the main tasks of the Field of Study Council is to monitor the implementation of the study programmes of the field of study and to review and approve the annual self-assessment report of the field of study, and submit it to the FSE Council.

The self-assessment report of the fields of study includes a description of the study programmes, analysing the results of a survey submitted for each study programme by students, graduates, and employers. A general student satisfaction survey is conducted in the spring semester, each academic year. The survey is administered using LAIS to all LiepU students. The results of the survey are available in the LiepU Quality Management System (QMS). The results are prepared for the faculty as a whole and for each study programme and are included in the self-assessment

report of the field of study and in the study programme description. Employer satisfaction is analysed by surveying the heads of the final/national examination commissions, and by including in the internship evaluation form questions about student theoretical knowledge, practical skills, and recommendations for further studies and work.

An electronic graduate survey is also conducted every academic year. The results are also produced for the faculty as a whole and for each of its study programmes, and are included in the self-assessment report of the field of study and the study programme description.

A Quality Management System (QMS) has been created to support the achievement of the goals set in the Development Strategy of Liepaja University. It includes procedures that regulate the creation, licensing, and accreditation of study programmes. Their descriptions, regulatory documents, document forms and templates, development and planning documents of LiepU and its units are available for employees and instructors in the QMS electronic support system, at [kvs.liepu.lv](http://kvs.liepu.lv) LiepU

Based on the changes in the accreditation of study programmes/fields of study, a foundation of regulations (procedures, rules) was developed to support the introduction of new study programmes and programmes. Separate procedures govern the preparation, approval, and change management of courses and study plans. Procedures are in place to govern the creation and management of changes to annual study plans, and the preparation and management of changes to timetables.

The higher-education quality improvement method has been used to ensure that existing doctoral programmes can be improved in line with the current trends in information technology, computer science, and engineering, and in line with public demand, based on the EFQM model. This method helps identify the state of organisation of education at different levels. The 9 criteria in the model (leadership, policy and strategy, people, resources, process management, customer satisfaction, people satisfaction, community impact, results) are developed through 5 stages of development. The quality assessment of the study programmes of the field of study is at Stage 4: chain-oriented. Improving the content and organisation of the programme is focused on the implementation of Stage 5: comprehensive quality.

The activity of representatives nominated by the Liepaja University Student Council is in the development of regulations, rules, and other regulatory documents, and in the monitoring of their implementation. Students were active in the following LiepU institutions: LiepU Constitutional Assembly, LiepU Senate, Faculty Council, Study Council, Science Council, Library Council, Scholarship Award Commission, LiepU Senate Scholarship Award Commission, Loan Award Commission, Study Programme Council.

During the reporting period, a new study programme was developed in the field of study: the vocational bachelor study programme in Smart Technologies and Mechatronics. It was approved by the Liepaja University Faculty of Science and Engineering Council (datums, protokola Nr.), Liepaja University Senate and Ventspils University of Applied Sciences Senate, and a licence (No 2021/02K, of 14 July 2021) was issued for its implementation.

According to the provisions of CDM project 'Reduction of fragmentation of study programmes at LiepU' (No 8.2.1.0/18/I/002), Liepaja University and Ventspils University of Applied Sciences cooperate in the development and implementation of the study programme in Smart Technologies and Mechatronics. Liepaja University is the leading university in this cooperation.

Several experts were involved in the development of the programme (Dr.ing. Aigars Krauze, Mg.sc.ing. Pēteris Bitāns, Mg.sc.ing. Imants Mockus, Mg.sc.soc. Iveta Žaime), and a consultant (B.sc.ing. R. Ekšteins).

Communication, exchange of information and opinions with the experts of the work group took place regularly and was shown in the monthly work report of each expert and consultant, as a time recording spreadsheet/form. Communication between the experts and the submission of deliverables was mostly done remotely, using modern technologies. The meetings of the work group of the CDM project 'Reduction of fragmentation of study programmes at LiepU' (No 8.2.1.0/18/I/002) were held at LiepU in person. They involved exchanging views and experiences, setting objectives, and discussing progress.

Two face-to-face seminars (27 August 2019, 16 October 2019) were held by September 2019 with the participation of experts, academics, employers, and industry professionals. In addition, the head of the programme development group met several times with instructors from Ventspils University of Applied Sciences to discuss the content and sequence of courses in electronics, and to update the course descriptions. The seminars were used to identify the views of employers, professionals, and experts on the concept of the new study programme, and to make recommendations for further development.

Key recommendations:

- harmonised learning of the programme's general courses;
- development of courses in line with innovations in engineering in and the Latvian education space;
- reduce fragmentation of courses within study programmes;
- respect the unity of theory and practice;
- integrate the 'Competence-based approach to learning content' project guidelines applicable to professional activities;
- Involve business and industry professionals in the selection of topics for studies and projects.

During the seminars, it was noted that today industry seeks specialists with knowledge and skills in the development, maintenance and repair of modern computer-controlled equipment, data transmission and statistical processing, remote control, etc.

Conclusions: mechatronics specialists are in high demand on the job market, and there is a need to train future specialists to meet today's requirements.

Implementing the study programme in cooperation with employers and industry professionals is an essential part of quality assurance. The concept of the study programme is oriented towards work-based studies (internships, projects) and the importance of practical activities in the study process (internships, seminars, laboratory work, etc.). All potential employers and professionals in the field pointed to the need for such an approach.

Liepaja University 'Regulations on final examinations, national examinations and final national examinations' (approved at the Liepaja University Senate meeting of 15 December 2014, Minutes No 4; amended at the Liepaja University Senate meeting of 25 April 2016, Minutes No 9, amended at the Liepaja University Senate meeting of 25 April 2016, Minutes No 9) establishes a commission for bachelor, master, and vocational higher education study programmes, consisting of five persons (chair and four members, one of whom is the secretary). The head of the commission and at least half of the members must be representatives of professional industry organisations or employers in the field. This composition of the final examination board also ensures that the results achieved are monitored by employers and professional organisations.

In developing the study programme, the resources and development trends of the university and the existing study programmes, student trends, student involvement in research and student exchange programmes, graduate employment in the profession of studies, etc. were investigated and analysed.

Main results of the development of the study programme in Smart Technologies and Mechatronics:

- the indicators and development trends of the Mechatronics study programme to date were investigated and analysed;
- European study programmes that train mechatronics specialists were researched, identifying commonalities and differences;
- Mechatronics Engineer occupational standard was investigated;
- the concept, goals, objectives, and expected results of the new study programme in Smart Technologies and Mechatronics were developed;
- a standard plan, courses, their scope, content, and expected results of the new study programme in Smart Technologies and Mechatronics were developed.

Overall conclusions: the study programme fulfils the objectives set out in the European Parliament report 'An Agenda for the Modernisation of Europe's Higher Education Systems'[1]:

- sets the conditions for an increase in the number of graduates;
- makes it possible to improve the quality of education;
- ensures the relevance of the education to the job market;
- strengthens links between education and research;
- builds cross-border cooperation, boosts opportunities for students to gain experience in universities and internships abroad.

[1] European Parliament (2012). Report on Modernising Europe's Higher Education Systems (2011/2294(INI)). Download here: [https://www.europarl.europa.eu/doceo/document/A-7-2012-0057\\_EN.pdf](https://www.europarl.europa.eu/doceo/document/A-7-2012-0057_EN.pdf)

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

The heads of the study programmes and senior instructors, as well as FSE dean's office staff regularly (especially in the first year of studies) discuss the organising of the study process and the rules of the LiepU internal regulations with the students of the field of study. In the bachelor degree programmes, these issues are also included in the course Introduction to Studies, Technology, and Research.

The Liepaja University Internal Regulations (<https://www.liepu.lv/uploads/files/LiepU%20ieksejas%20kartibas%20noteikumi%20studejosajiem%20English.pdf>) establish the right of students to submit proposals and suggestions to the management in all matters concerning the activities of students; at Liepaja University, and the work of teaching staff and other employees, to receive a reply within the specified time limit, and to receive information in all matters directly related to studies and possible career.

The LiepU management is required to 'listen to student proposals, suggestions, and critical remarks, and take measures to improve the working practices'. Replies to student proposals are provided in accordance with the procedures laid down in the laws and regulations, and included in

the self-assessment reports of the fields of study, indicating the changes made to the study programmes.

The procedure for submitting complaints and proposals is the following: the student submits a written application to the dean's office or emails it to the dean's office or the programme director. The application is registered on document management system DMS "Namejs" (dvs.liepu.lv) and the tasks are sent to the responsible individual — the dean, the programme director, the responsible member of the academic staff or another manager of the LiepU institution. Deadline for review — 10 working days. If necessary, a question might be included and reviewed in an Council meeting of the Faculty of Science and Engineering (FSE) , and a decision might be made. The applicant and the responsible person is informed about the response or action to be taken. If necessary, the FSE is ready to cooperate with other departments of LiepU to solve an issue.

In addition, all students are heard out on workdays via phone (63454046), email (dif@liepu.lv), or on-site at the dean's office of the FSE (Lielā ielā 14, Room 414), or on the premises of LiepU.

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

Statistical data on the number of students, enrolled students, graduates, academic staff are collected and analysed in the self-assessment report for the field of study by 1 October each year.

LiepU has developed procedures that determine the way the annual student satisfaction survey and graduate survey take place. The self-assessment reports of a fields of study analyse the relevance of the field of study and its study programmes to the job market demand, and the results of the annual employer survey.

Self-assessment reports of fields of study analyse information on financial resources for ensuring the teaching of the study programmes appropriate to the field of study, and for enabling the research (creative) activities of the academic staff.

Each year, the Senate analyses the results of the Admissions, and conducts a Scientific Activity Assessment and a Financial and Economic Activity Analysis.

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

Information about the study programmes is published on the LiepU website (<https://www.liepu.lv/> (in Latvian) and <https://www.liepu.lv/en> (in English)) and on the FSE website (<http://dif.liepu.lv/>; Latvian only). Person in charge of the information published:

- on the LiepU website in Latvian and English: secretary of the LiepU Admissions Committee Jana Jansone; the person in charge the information published on the LiepU website in Latvian: secretary of the LiepU Admissions Committee Jana Jansone
- on the FSE website in Latvian: head of the field of study Dzintars Tomsons

Information about the bachelor degree programmes is published:

- On LiepU website, in Latvian:
  - <https://www.liepu.lv/lv/1267/viedas-tehnologijas-un-mehatronika>
  - <https://www.liepu.lv/lv/759/informacijas-tehnologija>
- On LiepU website, in English:
  - <https://www.liepu.lv/en/174/smart-technologies-and-mechatronics>
  - <https://www.liepu.lv/en/49/information-technology>
  - <https://www.liepu.lv/en/48/computer-sciences>
- FSE website in Latvian: <http://dif2.liepu.lv/uznemsana/studiju-programmas-2/>

Information about the vocational master degree programme in Information Technology is published:

- On LiepU website, in Latvian: <https://www.liepu.lv/lv/592/informacijas-tehnologija>
- On LiepU website, in English: <https://www.liepu.lv/en/51/information-technology>
- FSE website in Latvian: <http://dif2.liepu.lv/uznemsana/studiju-programmas-2/>

Information about the doctoral programme in E-Learning Technologies and Governance is published:

- On LiepU website, in Latvian: <https://www.liepu.lv/lv/280/estudiju-tehnologijas-un-parvaldiba>
- On LiepU website, in English: <https://www.liepu.lv/en/112/e-study-technologies-and-management>
- FSE website in Latvian: <http://dif2.liepu.lv/uznemsana/studiju-programmas-2/>

Admission rules for study programmes are published in Latvian on LiepU website: <https://www.liepu.lv/lv/1254/uznemsanas-noteikumi-2022-2023>

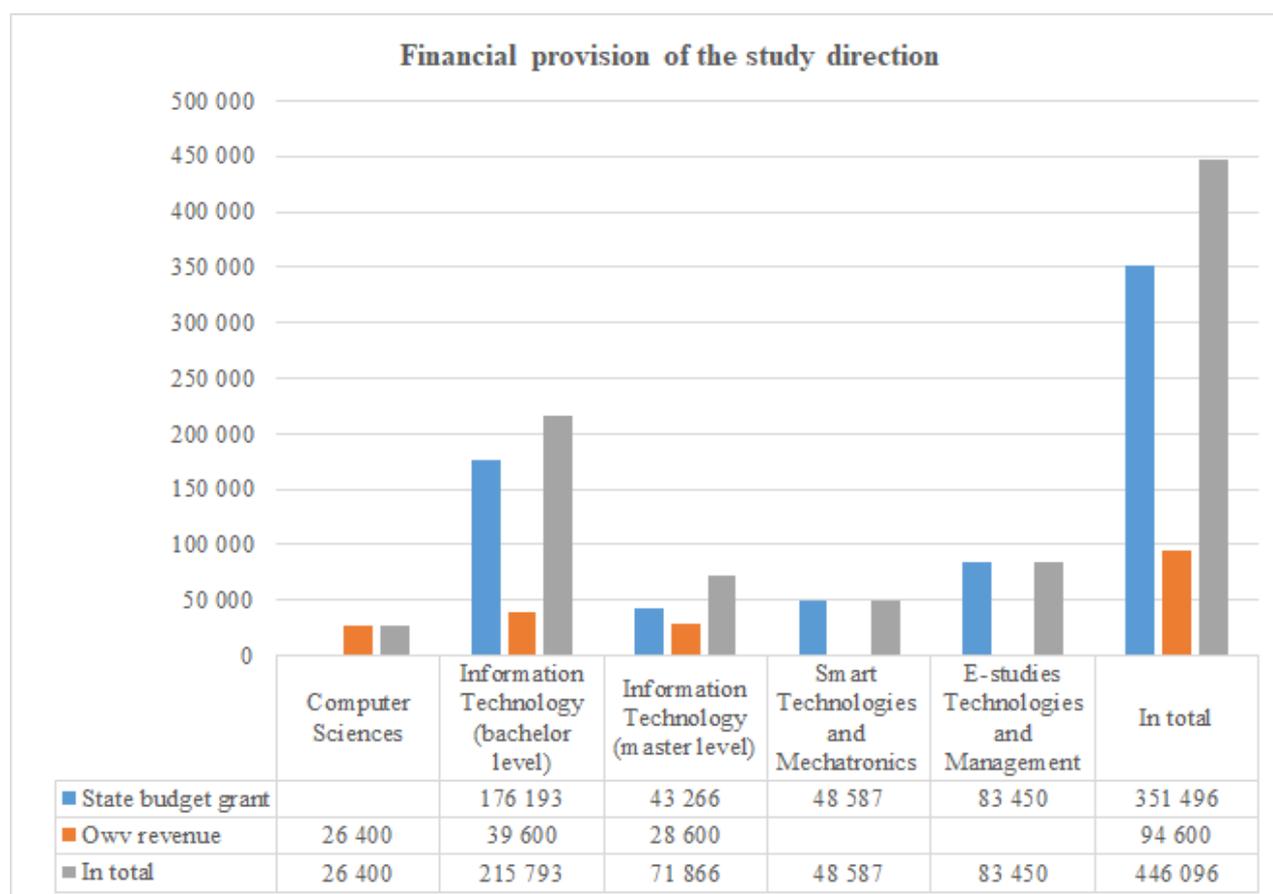
The English version of the application procedure is published on the LiepU website: <https://www.liepu.lv/en/93/application-procedure>

The persons responsible for the compliance of the information available on the LiepU website with the information available in the official registers (VIIS and E-platform) are the head of the LiepU IT center Kaspars Lauris and the head of the LiepU Studies department Ilze Magazeina.

## 2.3. Resources and Provision of the Study Field

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

In order to ensure the quality implementation of the field of study, it is important for Liepaja University (LiepU) to carry out financial flow planning and budgeting for each year. The financial resources of the field of study consist of the state budget subsidy (the majority of the budget income) and own income (tuition fees) Figure no. 1. Study programmes are financed in accordance with the cost of the study programme set by the Cabinet of Ministers. Tuition fees are paid from the funds of natural and/or legal persons, i.e. personal funds of the student, personal funds of the student's parents and other relatives, funds of the student's employer, a study loan guaranteed by the State. The amount of tuition fee and the payment procedure for each academic year shall be determined and approved by the LiepU Council. Students can choose an individual payment schedule according to their financial possibilities. In order to increase the number of students, LiepU offers tuition fee discounts and implements various promotions through its marketing and sales strategy. Tuition fee discounts and other fees related to the study process shall be approved by the LiepU Council for each academic year. The provision of financial resources is stable. The base cost per state-funded study place is set at EUR 1,630.11 in 2022, compared to EUR 1,333.36 in 2014. In the reporting period the tuition fee for the full-time professional bachelor's degree programme "Information Technology" was increased from EUR 1,410 (in English - EUR 2,200) to EUR 2,100 (in English - EUR 2,500), the tuition fee for the full-time Master's study programme "Information Technology" was increased from EUR 1,580 (in English - EUR 2,200) to EUR 2,400 (in English - EUR 2,800), the tuition fee for the full-time academic Bachelor's study programme "Computer Science" in English was increased from EUR 2,200 to EUR 2,500, the tuition fee for the doctoral study programme "E-Learning Technology and Management" was increased from EUR 2,590 to EUR 4,100.



1. **Figure** Funding of the field of study in the academic year 2021/2022, EUR.

### Cost of study place per student and evaluation thereof

The funding of studies from the state budget is allocated each calendar year in accordance

with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists.

The calculation of the projected costs of the professional bachelor study programme "Information technology" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2022 is EUR 2 445.17.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,100 (in English - EUR 2,500) and it is fixed for the whole study period, the total tuition fee for 4 years is EUR 8,400 (in English - EUR 10,000). Minimum number of students per course for full-time study: 10 students.

The calculation of the projected costs of the professional master study programme "Information technology" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.5 The cost per study place in 2022 is EUR 3 667,75.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,400 (in English - EUR 2,800) and it is fixed for the whole study period, the total tuition fee for 2 years is EUR 4,800 (in English - EUR 5,600), and for 4 years EUR 7,200. Minimum number of students per course for full-time study: 10 students.

The calculation of the projected costs of the academic bachelor study programme "Computer science" for full-time study for the period 2021-2022 is based on the base costs for 2021 and 2022 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2022 is EUR 2 445.17.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,500 (in English) and it is fixed for the whole study period, the total tuition fee for 3 years is EUR 7,500 (in English). Minimum number of students per course for full-time study: 10 students.

The calculation of the projected costs of the professional bachelor study programme "Smart technologies and Mechatronics" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Engineering science" established by the Ministry of Education and Science: 1.7, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2022 is EUR 2 771.19.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,220 (in English - EUR 2,700) and it is fixed for the whole study period, the total tuition fee for 4 years is EUR 8,880 (in English - EUR 10,800). Minimum number of students per course for full-time study: 10 students.

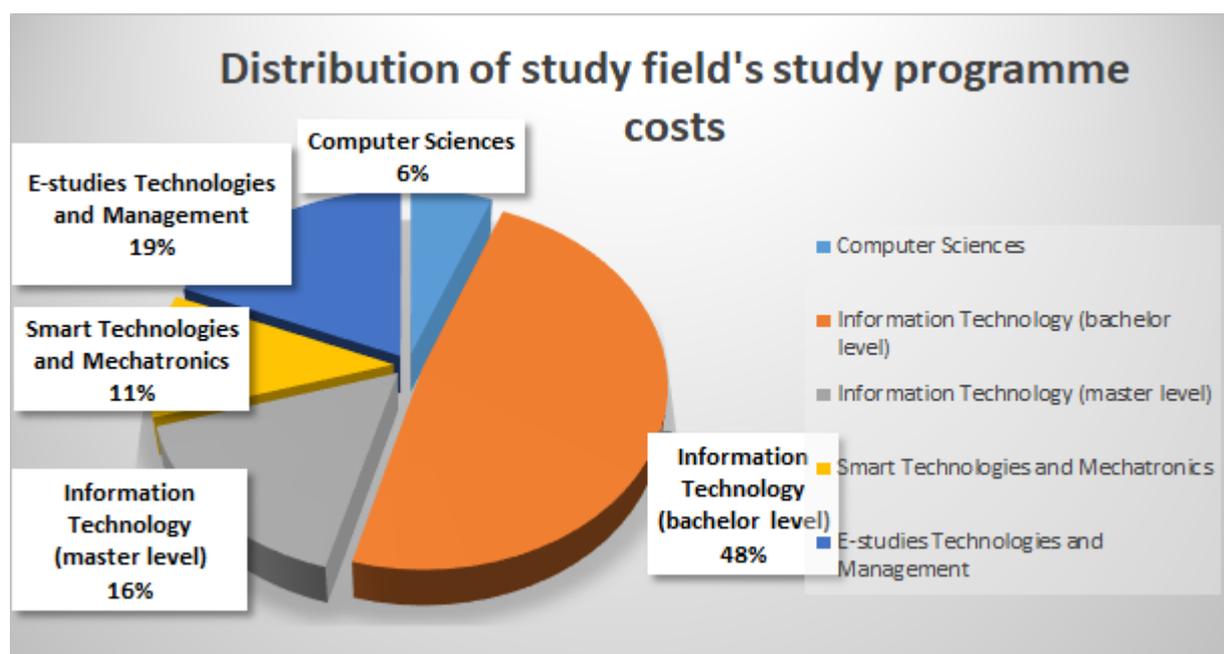
The calculation of the projected costs of the doctoral study programme "E-learning technologies and management" for full-time study for the period 2021-2022 is based on the base

costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 3.0 The cost per study place in 2022 is EUR 10 095.30.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 4,100 (in English - EUR 4,200) and it is fixed for the whole study period, the total tuition fee for 4 years is EUR 16,400 (in English - EUR 16,800). Minimum number of students per course for full-time study: 10 students.

### Assessment of the percentage breakdown of costs within the field of study

Total funding for the 2021/2022 academic year (Fig.1) EUR 446 096. Figure 2 shows the percentage breakdown of costs by study programmes. 6% of the cost is accounted for by the study programme "Computer science". As of 01.10.2021, there were 15 students in this study programme. 48% of the cost is accounted for by the study programme "Information technologies" (bachelor) As of 01.10.2021, there were 98 students in this study programme. 16% of the cost is accounted for by the study programme "Information technologies" (master) As of 01.10.2021, there were 18 students in this study programme. 11% of the cost is accounted for by the study programme "Smart Technologies and Mechatronics". As of 01.10.2021, this full-time study programme had 20 students. 11% of the costs are accounted for by the study programme "E-learning technologies and management". As of 01.10.2021, this full-time study programme had 10 students.

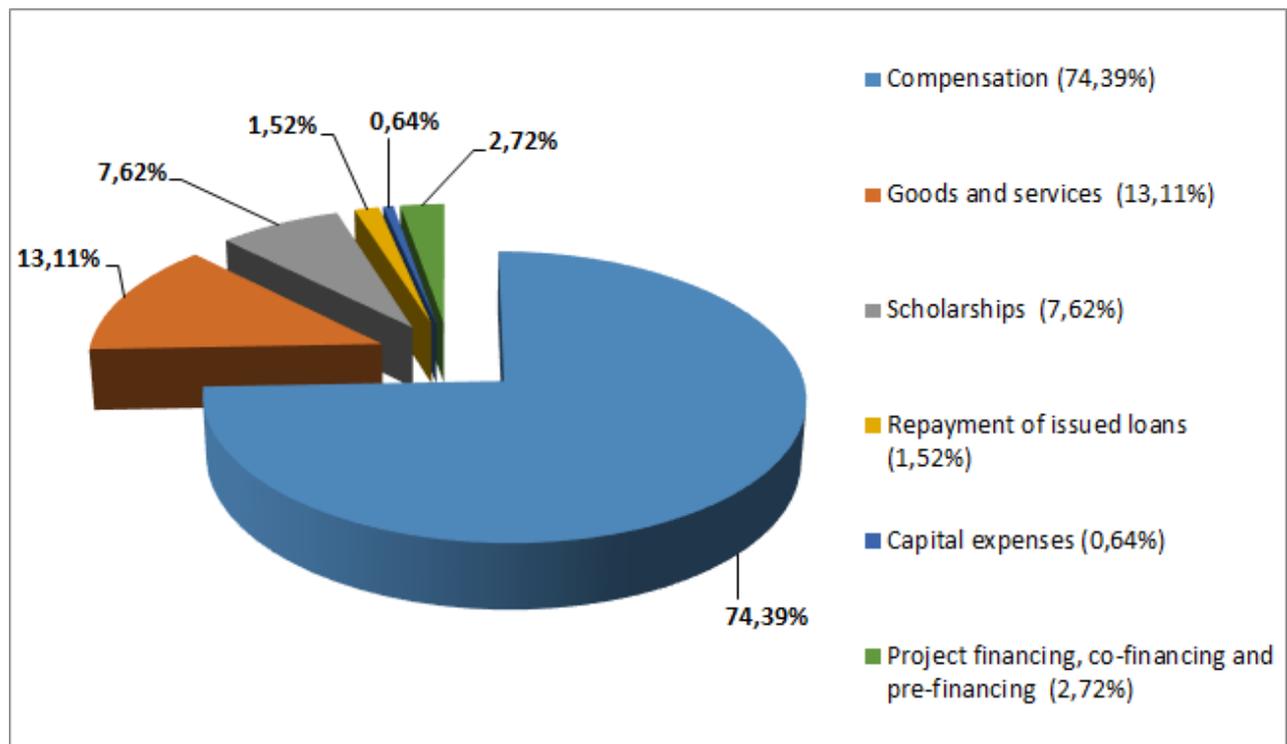


**Figure 2** Breakdown of the costs of study programmes in the academic year 2021/2022.

Expenditure planning of the field of study is carried out jointly with the other study fields. An analysis of the main budget expenditure lines shows (Figure 3) that the largest expenditure line is salaries, with a relatively high share of salaries of teaching staff and royalties paid for teaching courses and maintaining content. The second largest expenditure item is maintenance of buildings and premises, as well as expenditure directly related to student support and services, marketing costs and other technical maintenance costs, which are regularly reviewed and optimised, prioritising an easily accessible and enjoyable learning environment for students on site. Expenditure on the purchase of literature, periodicals and subscriptions to electronic databases is included in the overall core budget of LiepU. All study programmes are provided with study and

research resources in the LiepU library.

Overall, the cost structure is considered optimal and in line with the development strategy.



**Figure 3** Structure of fund expenditure in the core budget in 2021.

### Financial provision for scientific research and/or artistic creation

Funding for scientific research comes from several sources: Basic funding for scientific activities granted by the Ministry of Education of the Republic of Latvia (according to the Cabinet of Ministers Regulation No 1316 "Procedure for calculating and granting basic funding to scientific institutions": for maintenance of elected scientific staff, scientific infrastructure, as well as partial provision of research work for academic staff: professors, associate professors and lecturer who perform scientific work), Performance funding, funds raised in a competitive procedure (internal grants, project co-financing, projects), as well as the Scientific Activity Development Fund of the Liepaja University.

Due to the amendments made to the Cabinet of Ministers Regulation No. 994 "The Procedure for Financing Universities and Colleges from State Budget Funds", which provides for performance funding for results in research and artistic creativity, funding has increased in the last three years. The Liepaja University shall use the funds allocated for the previous year's results in research and artistic creativity in accordance with the approved budget. For the support of scientific activities of the academic staff involved in the field of study, funding is allocated from the development budget of the LiepU Faculty of Natural Sciences and Engineering and the LiepU Scientific Activities Development Fund. The following priorities have been set for receiving this funding: full or partial financial support for publications in *Web of Science* and *Scopus* databases, in humanities - also in ERIH+; full or partial financial support for publications in other databases (e.g. EBSCO, etc.); development and publication of peer-reviewed scientific monographs; preparation and publication of follow-up publications in LiepU scientific journals and databases. The Faculty's development budget is also used for travel to scientific conferences, participation fees and support for student research.

Academic staff applications for scientific publications and conferences are reviewed and approved

by the Faculty Council. According to the LiepU Student Research Projects Competition Regulations (approved on 15.12.2014 in LiepU Senate meeting, protocol No.4) students have access to funding for scientific and creative activities.

### **Funding sources and university/college tools to manage them**

The total annual budget of LiepU consists of a cash flow budget, which consists of incoming and outgoing funds for the planned calendar year. Financial resources for the study process at LiepU consist mainly of:

- Transfers from the general state budget for higher education
- Cash received from fee-based services, including tuition fee income;
- Deductions from projects to cover centralised expenditure;
- Donations and gifts;
- Revenue earmarked for specific purposes;
- Other own-source fund income;
- European Union structural funds;
- The balance of funds in the core budget bank account from the previous calendar year.

The Director of Finance and Personnel, with the prior agreement of the Budget Commission, shall set the limits for the total amount of expenditure of the core budget for the departments. Each middle-tier manager, together with the staff under his/her authority, shall, taking into account the overall expenditure limit for the unit, draw up a detailed expenditure plan for his/her unit, which shall be submitted to the Budget Commission for approval. In order to avoid the situation where the establishment of limits on the amount of expenditure prevents a unit from achieving its objectives, and to avoid the situation where new ideas related to the activities of the organisation or its units are not discussed and supported, the head of the unit has the opportunity to argue his/her point of view to the Budget Committee during the budget examination process. The Budget Committee is responsible for hearing the views of the Heads of Unit and taking the final decision. The Director of Finance and Personnel prepares the University's overall core budget. The total basic budget is reviewed, evaluated and the final version is approved by the Budget Commission and approved by the LiepU Council.

Following the approval of the overall core budget by the Council, the Procurement Officer of the Procurement Committee shall prepare the overall procurement plan for the current calendar year and organise the procurement in accordance with the Public Procurement Law and the QMS procedure.

The Director of Finance and Personnel ensures that the persons preparing the budget shall act in accordance with the instruction "Planning, Execution and Control of the Liepaja University Core Budget" during the budget planning and execution process. Budget planning is carried out in accordance with the QMS procedure A-2-1 "Core Budget Planning", and execution and control in accordance with procedure A-2-2 "Execution and Control of the Core Budget". The budget breaks down incoming and outgoing funds by main types of expenditure. The analysis of the funding is carried out annually and approved by the LiepU Council.

Every calendar year LiepU and LiepU Student Council, in order to support and promote the activities of student self-government, renew the cooperation agreement and determine the allocated funding from LiepU basic budget, which is not less than one two-hundredth of the annual budget, in accordance with Article 53 of the Law on Higher Education Institutions.

The results of the economic activity are regularly reported in the annual report and the auditors' opinion. LiepU financial indicators show a stable financial situation.

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

The LiepU infrastructure for the implementation of study programmes is good — its well-equipped equipped classrooms have audio, video, and projection equipment, interactive whiteboards, as well as computer equipment and measuring equipment installed in computer classrooms and the physics laboratory. The videoconferencing equipment enables the participation of guest instructors as part of the remote teaching of the study programme. Students and instructors can use university computers and presentation equipment in the faculty's computer labs, and the LiepU Information Technology Service Laboratory and LiepU library infrastructure:

- 320 computers (80 of which are less than 3 years old);
- 23 video projectors;
- 7 interactive whiteboards;
- 6 photocopiers;
- 18 photo and video cameras (11 photo cameras, 7 video cameras).

Students have access to a free-access wireless network in each of the study buildings (a total of 36 wireless network access points have been installed), allowing students to use their personal laptops and mobile devices for independent work. A workstation virtualisation solution has been implemented and three computer classes are equipped with workstation clients (63 workstations in total). Students have their own virtual computer, which is not attached to their workplace. This solution enables the mobility and security of the study process. Modern network hardware has been installed to virtualise the computer network and a CAMPUS computer network connection has been set up between all study buildings. LiepU has a cooperation agreement signed with Microsoft for the leasing of MS Office and MS Windows software licences, which can be used by instructors as part of teaching, and in the production of teaching materials. Under this cooperation agreement, LiepU instructors and students have access to MS Office 365, a 1Tb file archive in the cloud, etc. at no extra charge.

To enable the study process, the LiepU Faculty of Science and Engineering (FSE) manages 10 laboratories, 11 subject-specific classrooms, and 11 computer classrooms. 8 laboratories are located at Lielā iela 14, and 2 at Kr. Valdemara iela 4).

FSE laboratories:

- Computer Network and System Laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping Laboratory (Lielā iela 14, Room 004),
- Paper Recycling Laboratory (Lielā iela 14, Room 003),
- Physics and Mechatronics Laboratory (Lielā iela 14, Room 430),
- Environmental Technology Laboratory (Lielā iela 14, Room 407),
- Environmental Chemistry Laboratory (Lielā iela 14, Room 407),
- High Performance Computing Laboratory (Lielā iela 14, ),
- Smart Technologies Laboratory (Lielā iela 14, Room 427),
- Biogas Laboratory (Kr. Valdemāra iela 4),
- Nanotechnology Laboratory (Kr. Valdemāra iela 4).

FSE subject-specific rooms (Lielā iela):

- Software Engineering Room (with 18 computer workstations; Room 415),
- Computer Science and Computer Management Room (with 13 computer workstations; Room 416),
- Programming Room (with 20 computer workstations; Room 437),
- Programming Room (with 18 computer workstations; Room 434),
- Mathematics Room (with 13 computer workstations; Room 426),
- Computer Graphics Room (with 13 computer workstations; Room 337),
- Videoconferencing Room (with 9 computer workstations, Room 426a),
- Computer Room (with 18 computer workstations; Room 343),
- Computer Room (with 12 computer workstations, Room 402)
- Nature Embassy (Room 403),
- Circular Economy Centre (Room 003),
- Environmental Biology Room (Room 412).

In 2019, the LiepU Faculty of Science and Engineering installed a Raspberry Pi microcomputer classroom (12+1 workstations), purchased 15 Arduino microcontroller and sensor kits, a WAGO professional PLC controller and sensor kit, RPi cameras, data transmission modules, displays, prototyping boards, self-mobile robots, and other equipment for the Internet of Things (IoT), Robot Control, PLC Controller Programming courses

**2.3.3. Provide information on the system and procedures for the improvement and purchase of the methodological and informative provision. Description and assessment of the availability of the library and the databases to the students (including in digital environment) and their compliance with the needs of the study field by specifying whether the opening times of the library are appropriate for the students, as well as the number/area of the premises, their suitability for individual studies and research work, the services provided by the library, the available literature for the implementation of the study field, the databases available for the students in the respective field, the statistical data on their use, the procedures for the replenishment of the library stock, as well as the procedures and possibilities for the subscription to the databases.**

The Liepaja University library offers a support to Liepaja University students and teaching staff in the process of their studies and research. The LiepU library is a division of the university that supports the study process and scientific activities with information resources and services. Information about the library is available in the Library section of the LiepU website (e.g. here: <https://www.liepu.lv/en/85/contacts-and-opening-times>). According to the Liepaja University Library Statute, the objectives of its activities are to support the study process and scientific activities with printed, electronic, and other documents, and to function as a cultural centre that promotes national and regional cultural values. The library develops its collection and offers services in the pursuit of its objectives.

#### *Library collection and database resources*

The library's collection consists of approximately 65,800 items (94% monographic printed works and other documents, 6% periodicals). 75% of the entire collection is on open-access shelves, allowing staff and students to choose the items that best suit them on their own.

The topic relevance of the collection to the study programmes of the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science is as follows:

1. The academic bachelor study programme in Computer Science offers literature on such subjects as business management, applied communication, programming, calculus and mathematical statistics, database technologies, information system security, user-computer interaction, computer networks, etc. Of all the information resources held by the library, some 2.5% of the (printed) items in the collection are on these topics. Given the specific nature of the topics, more attention has been paid to the availability of e-books in subscription databases. For example, the EBSCO e-book collection contains about 11,400 titles with the following keywords: business management systems, software engineering, technology research, programming languages, data processing and analysis, Internet of Things, mobile apps, operating systems, database technology, information systems security, user-computer interaction, cloud computing and computer networks, etc.
2. Students of the vocational bachelor study programme in Information Technology have access to literature on such subjects as business management, applied communication, programming, calculus and mathematical statistics, database technology, information systems security, user-computer interaction, computer networks, etc. Of all the information resources held by the library, some 2.5% of the (printed) items in the collection are on these topics. Given the specific nature of the topics, more attention has been paid to the availability of e-books in subscription databases. For example, the EBSCO e-book collection contains about 16,100 titles with the following keywords: business management systems, software engineering, technology research, programming languages, algorithms and data structures, data processing and analysis, mobile apps, operating systems, Internet of Things, database technologies, information systems design and security, data quality management, user-computer interaction, computer architecture, computer networks, internet technologies, artificial intelligence, innovation management, cloud computing, geographic information systems, smart technologies, etc.
3. Literature is offered to support the learning process as part of the vocational bachelor study programme in Smart Technologies and Mechatronics, with such course topics as business, project and HR management, applied communication, general quality management, mathematics, programming, electronics, mechanics, engineering, etc. Of all the information resources held by the library, some 2.5% of the (printed) items in the collection are on these topics. Given the specific nature of the topics, more attention has been paid to the availability of e-books in subscription databases. For example, the EBSCO e-book collection contains about 22,900 titles with the following keywords: research in technology, business and project management, business communication, general quality management, programming languages, electronics, metrology and measurements, thermodynamics, algorithms and data structures, operating systems, computer architecture, mechanics of materials, hydraulics and pneumatics, manufacturing technologies, electrical engineering, sensors, database technologies, internet of things, artificial intelligence, cloud computing, innovation management, smart technologies, smart materials, etc.
4. Students of the vocational master study programme in Information Technology can access literature on the following subjects, e.g. computer science, IT project management, general quality management, artificial intelligence, smart technologies, machine learning, software engineering, programming and programming languages, computer graphics, cloud computing and servers, computer systems and computer networks, system architecture, information systems analysis, design and security, database technologies, etc. Of all the information resources held by the library, some 1.5% of the (printed) items in the collection are on these topics. Given the specific nature of the topics, more attention has been paid to the availability of e-books in subscription databases. For example, the EBSCO e-book collection contains about 11,300 titles with the following keywords: technology research, IT project management, general quality management, artificial intelligence, smart technologies,

machine learning, business process modelling, user behaviour, content management systems, information systems architecture and security, cloud computing, software engineering, programming languages, computer graphics, mobile apps, database technologies, etc.

If the library does not have the necessary information resources, the services of the Interlibrary Loan (ILL) and the International Interlibrary Loan (IILL) are offered. Successful cooperation has been established with the SUBITO document delivery service, the National Library of Latvia, and other Latvian and foreign libraries. The total number of requests for a domestic interlibrary loan (ILL) in 2021 was 24.

In the digital environment, the library offers free use of databases for the needs of the students and teaching staff, organising access to subscription, trial, and open access databases within the LiepU computer network and beyond. Access to subscription databases outside the LiepU computer network is provided through the LiepU e-library interface (available here: <https://e-biblioteka.liepu.lv/> (Latvian only)). To access databases remotely, the user must use a VPN service. LiepU personnel, teaching staff and students can install and configure the VPN service on their computers by following the instructions for setting up the VPN client (available at <https://serviss.liepu.lv/vpn-klienta-iestatisana-datora/> (Latvian only)).

Students and instructors have at their disposal online databases subscribed by LiepU, such as Cambridge Journals Online, EBSCO eBooks Academic Collection, EBSCO Academic Complete, Science Direct, Scopus, Web of Science, Student Kit Lursoft special offer for students, Letonika (expanded with a subscription to the Reading Room section), and Dienas Bizness' Marketing Handbook and Business Manager Handbook. Everyone can also use the library's open-access databases: Academic Staff Publications Database, Doctoral Theses Database, and Final Theses Database. For the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science, databases such as EBSCO offer information resources on various topics of the courses taught in the study programmes, as mentioned above. The library provides training, reference and consultations on the use of information resources and services. 25,827 information resource use sessions were recorded in the library's subscribed databases in 2021.

#### *Library infrastructure and services*

If the library is not affected by COVID-19 pandemic restrictions, it is open 55 hours a week (8:00 to 18:00 or 19:00 on weekdays, and 11:00 to 16:00 on Saturdays). During the pandemic, the library's working hours were reduced to 45 hours per week (8:00 to 17:00 on weekdays). The recorded average on-site use of the library in 2021 was 25 users a day [compared to (without the pandemic restrictions) 150 users per day in 2019].

Users have a access to the following services: subscription (for issuing and receiving information resources), a copying facility (for copying, printing, scanning, and binding papers), a group discussion room (on request by users), and 96 workstations for independent study and research in the reading room and library lobby, 16 computer workstations with internet access in the Electronic Resources Reading Room (the number of workstations in the library was reduced due to COVID-19 epidemiological safety restrictions).

During the library working hours, users can use the self-check device to take or return books, or contact the librarian on duty. Outside the library working hours, books can be put in the book drop box in the Liepaja University lobby. Free Wi-Fi is available throughout the library. Since 2011, an RFID security system is used to identify and protect the library's information resources.

In addition to issuing and receiving information resources as part of the subscription service, and

the electronic ordering of information resources, extension of loans via the electronic catalogue and use of reading rooms, the library offers such services as on-site, e-mail, or phone enquiries and consultations on the use of information resources and services, in-person or remote (*MS Teams*) training sessions for library users, use of the library's subscription, trial access, and open access databases. The digitisation service (on-demand scanning) saw much development during the COVID-19 pandemic.

The library's activities have been automated for 30 years (since 1992). The ALISE library information system automates library processes such as bibliographic data processing, order picking, reader registration, issuing/receiving, ordering/booking, remote access through webPAC, mobile WebPAC, etc. The LiepU library electronic catalogue (<https://alise.liepu.lv/Alise/en/home.aspx>) and Joint University and Special Library Catalogue (<https://alise.liepu.lv/Alise/en/federatedsearch.aspx>) are available remotely via computers and mobile devices. The library's electronic catalogue provides a general search of bibliographic information covering the collection and the local databases created by the library. Remote access allows users to log in to the 'My library' section from anywhere and keep track of books issued, due dates, requests to extend the loans, and to book or queue for the literature needed. In 2021, the library's electronic catalogue recorded approximately 116,000 information search queries.

Up-to-date information about library services and working hours is available in the library section of the LiepU website (<https://www.liepu.lv/en/85/contacts-and-opening-times>), while details about information resources, in the LiepU library monthly newsletter *Lasonis* (<https://www.liepu.lv/lv/223/jaunieguvumi> (Latvian only)). LiepU library also posts the latest news on its social media accounts (Facebook, Twitter).

#### *Procedures for making additions to the library collection and subscribing to databases*

The library collection is assembled according to the needs of study programmes, in cooperation with teaching staff and students. In accordance with LiepU QMS procedure A-10-II 'Building the library collection', instructors fill in the 'Request to expand the collection of the library, for the LiepU Library Expansion and Processing Unit'. Any member of the teaching staff (elected or guest) may fill in and submit a request with recommendations for the purchase of information resources. Students can submit recommendations for the purchase of information resources by filling in the web form published on the LiepU website, in the Library Collections section (available at: <https://www.liepu.lv/lv/1340/studenta-ieteikums-gramatas-iegadei>) (Latvian only) or Student Application Forms section (available at: <https://www.liepu.lv/lv/1239/pieprasijuma-veidlapa-krajuma-komplektesanai>) (Latvian only). The applications are reviewed in accordance with the library's Collection Policy.

The decision to subscribe to a particular database is made in several stages. First, a data analysis takes place: 1) usage statistics for free trial databases; 2) usage statistics for subscribed databases over several years. Attention is also paid to the recommendations of the teaching staff. Second, the matter of changes in the database offer is discussed by the Library Council (8 members), which includes representatives of the LiepU management, faculty teaching staff, students, and library staff. Third, the matter of database subscriptions is discussed with the head of Finance and Human Resources, and the vice-rectors for science and studies. Their opinions are received, and a decision is made.

#### **2.3.4. Provide a description and assessment of information and communication technology solutions used in the study process (e.g., MOODLE). If the study programmes within the**

**study field are implemented in distance learning, the tools specially adapted for this form of study must also be indicated.**

The specific features of the field of study are associated with information and communication technologies, and their description is included in Section 2.3.2 of this document.

The University uses information systems to support the study process:

- Alise library information system (<https://alise.liepu.lv/Alise/en/home.aspx>),
- Moodle e-learning environment (<https://estudijas.liepu.lv/?lang=en>);
- Latvian University Information System, LAIS. (<https://www.lais.lv/>)

During the study admission process, students of the University of Liepāja get access to the information system of Latvian higher education institutions (LAIS) and the e-learning environment Moodle. LAIS supports the management of the learning process, while the e-learning environment Moodle ensures the implementation of the study process. Data integration has been implemented between LAIS and Moodle. Students and academic staff connect to the e-learning platform Moodle on the website [estudijas.liepu.lv/](https://estudijas.liepu.lv/), using the username and password issued by LAIS. This can also be done from the LiepU website <https://www.liepu.lv/en> using link "Current students \ E-studies (Moodle)".

Since February 3rd, 2020, it is stated as mandatory for the academic staff and students of Liepaja University to use the e-learning environment Moodle in the study process. For each course registered in the LAIS system, a corresponding Moodle course has been created, in which students are registered automatically after self-registering for studies for the current semester in LAIS (in accordance with the semester study plan). At the end of the semester, the final grade of the course, put by the university in the Moodle course, automatically has been transferred to the LAIS system.

In the e-learning platform, it is possible for teachers to publish study materials, receive the developed works submitted by students, as well as create websites for the materials necessary for the study process, purposefully participate in the development of diverse student competences testing materials, evaluate, provide feedback. The range of tools used in the Moodle environment is constantly updated, transformed according to the recommendations of the teachers.

In order to develop modern understanding of the academic staff regarding the challenges of the digital age, from March to June 2022, special training of academic staff had took place within SAM project No. 8.2.2.0/18/I/003. After market research in the field of such training and identification of the needs of LiepU, the training curriculum contains three thematic parts: 1) digital teaching aids; 2) Moodle; 3) Microsoft Teams.

In addition, students have access to several databases of scientific publications: EBSCO, Letonika, ScienceDirect, SCOPUS, Web of Science, Cambridge Journals Online, and Sage Knowledge. A cooperation agreement was signed with Microsoft for the leasing of MS Office and MS Windows software licences, which can be used by instructors as part of teaching, and in the production of teaching materials. Under this cooperation agreement, LiepU instructors and students have access to MS Office 365, a 1Tb file archive in the cloud, etc. at no extra charge.

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

## **Electronic link for the regulations governing the recruitment and/or employment of instructors:**

**<https://www.liepu.lv/lv/181/darba-iespejas> (Latvian only)**

In order to ensure high-quality and innovative implementation of the study programme, several criteria were used for the selection of the academic staff to be involved in programme, making sure that the courses are taught by qualified, scientifically, and methodologically prepared instructors, specialists in the field of study, who use modern approaches in their work.

The mandatory criteria for selecting the teaching staff are:

- the qualifications of teaching staff meet the requirements set by applicable laws and regulations;
- research area/interest relevant to the study programme/course;
- appropriate knowledge of the official language and of foreign languages.

The selection of teaching staff for the implementation of study programmes is based on the 'Criteria for the evaluation of professional qualifications of academic staff for courses' (Approved by LiepU Study Council on 13 June 2005; available at [kvs.liepu.lv](http://kvs.liepu.lv)).

The professional qualifications of academic staff are assessed by the Faculty Council according to the following criteria:

- For academic bachelor and master study programmes:
  - Doctoral, master degree appropriate to the course taught, or one in a related field;
  - Publications in a sub-discipline or field of artistic creativity.
- For vocational and vocational bachelor and master study programmes:
  - Doctoral, master degree appropriate to the course taught, or one in a related field;
  - Publications in a sub-discipline or field of artistic creativity;
  - At least 5 years of professional activity relevant to the course to be taught;
  - Relevant vocational higher education.

The requirements set for the candidates for a teaching position are set in accordance with the Liepaja University 'Regulations on elections to academic positions'; the person must have a doctoral or master degree in a relevant or related field of science, have research/creative work experience, have had publications/creative works in a relevant or related field of science, have experience in the development or improvement of teaching materials, have good command of English (at least B1, B2, C1 according to the *Europass* self-assessment framework), and the ability to apply language skills in studies and teaching, have good digital skills according to the *Europass* self-assessment framework, and have knowledge of new technologies.

The requirements for the selection and participation of foreign teaching staff in the teaching of study programmes are specified in the Liepaja University Academic Staff Development Plan for 2018–2022.

According to the Law on Higher Education Institutions(<https://likumi.lv/ta/en/en/id/37967>), and the Liepaja University 'Regulations on elections to academic positions' of 20 June 2011 (<https://www.liepu.lv/lv/672/nolikumi> (Latvian only)), residents of the Republic of Latvia and foreign citizens can be elected to academic positions, and their election to academic positions is governed by these regulatory documents.

**Application, selection procedure and criteria for foreign academic staff** (according to the Academic Staff Development Plan, page 39; Latvian only)

1. An open competition is organised for the selection of doctoral students and scientific degree candidates by publishing an announcement in the official gazette *Latvijas Vēstnesis*, on the European Commission portal *Euraxess* and on the Ministry of Education and Science website *izm.gov.lv*.
2. The requirements for the applicants are set in accordance with the Liepaja University 'Regulations on elections to academic positions' (<https://www.liepu.lv/lv/672/nolikumi> (Latvian only)) and in addition to the specific requirements set for the fields of study—Arts; Management, Administration, and Real Estate Management; Information Technology, Computer Engineering, Electrical Engineering, Telecommunications, Computer Management, and Computer Science; Environmental Protection and Education; Education, Teaching and Sport:
  - the person must have been employed in an academic position at an accredited foreign higher education institution within the previous five years,
  - the person holds a doctorate in a relevant or related discipline (at least a master degree in arts),
  - the person has research/creative experience,
  - the person has publications/creative work published in a relevant or related scientific field,
  - the person has experience in developing or improving learning materials,
  - the person uses innovative teaching methods in the study process,
  - the person has a good command of English (at least C1 level according to the *Europass* self-assessment framework) and the ability to use the language skills in their study and teaching work,
  - the person has good digital skills according to the *Europass* self-assessment framework, and knowledge of new technologies.
3. The selection process evaluates the documents submitted:
  - an application addressed to the rector,
  - the CV in *Europass* format,
  - a copy of the degree/master diploma,
  - a list of publications (creative works) in the last five years.
4. As part of CDM projects, the applicant's motivation to participate in the project and willingness to continue cooperation with Liepaja University after the completion of the specific CDM project will be additionally assessed.
5. Applicants are assessed by an Applicant Assessment Commission established by the rector.
6. Candidates are elected to LiepU academic staff positions in accordance with the LiepU

'Regulations on elections to academic positions.'

According to the Law on Higher Education Institutions (<https://likumi.lv/ta/en/en/id/37967>) and the Liepaja University 'Regulations on elections to academic positions' of 20 June 2011 (<https://www.liepu.lv/lv/672/nolikumi> (Latvian only)), elections to Liepaja University academic positions take place as part of an open competition. Taking into account the need to acquire practical skills and knowledge, a person with higher education without a scientific doctoral degree or without a vocational doctoral degree in arts may hold the position of docent, lecturer and assistant in professional study programme profile subjects if they have sufficient practical work experience. To be elected as a docent, a person who does not hold a doctorate or a vocational doctorate in arts must have at least seven years of practical experience. The requirements for applicants for the position of a docent at a higher education institution or college are approved by the senate or the council, as appropriate. Lecturers and assistants who do not have a scientific or

academic degree must have five years of practical work experience (in accordance with Article 39 of the Law on Higher Education Institutions, and the Liepaja University 'Regulations on elections to academic positions').

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

**Procedure for ensuring the qualifications and quality of work of the academic staff:**

The qualitative composition of the teaching staff working in the field of study complies with the requirements of the Law on Higher Education Institutions and Cabinet Regulation 512.

The qualifications of the academic staff involved in the implementation of the study programme are appropriate to the specific nature of the study programme and the conditions for its implementation. The teaching staff are professionals in their fields of study who have demonstrated their competence in research and in the use of the digital environment in the study process; they have participated in various international projects, and have developed course materials and teaching aids.

**Upskilling opportunities provided:**

The development of professional qualifications among the teaching staff is in compliance with the LiepU quality management system rules and criteria, which are monitored and provided with feedback by the head of the field of study, the head of the programme and field of study council.

The criteria used to monitor the quality of instructor work are as follows:

- student evaluation (LiepU QMS questionnaire);
- instructor self-assessment (LiepU QMS questionnaire);
- indicators for the evaluation of study internships (QMS internship evaluation questionnaire);
- effective participation in activities intended to improve didactic competence, including
- the preparation of didactic seminars, class visitations, participation in lifelong learning, etc.

In order to improve the quality of scientific and teaching activities among the teaching staff, three medium-term planning documents were developed in 2018, aimed at the development of LiepU human resources.

1. **The LiepU Human Resources Development Plan for 2018-2023** assesses the current situation, defines the objectives, tasks, and deliverables for the human resources management processes.

The aim of the LiepU Human Resources Development Plan is to provide Liepaja University with the necessary human resources, to facilitate the development of existing human resources (academic and other staff), professional growth and improvement, inclusion of new teaching and research staff in the university education and research process, to provide modern, development-oriented studies,

research, lifelong learning, in accordance with the LiepU Development Strategy.

The LiepU Human Resources Development Plan for 2018–2023 was developed in accordance with:

1. Laws and regulations effective in Latvia;
2. LiepU Constitution (available at: <https://www.liepu.lv/lv/172/satversme> (Latvian only));
3. LiepU Development Strategy for 2016–2020 (available at: [https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja\\_University\\_Development\\_Strategy\\_Summary\\_2016-2023\\_25.01.2021.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja_University_Development_Strategy_Summary_2016-2023_25.01.2021.pdf));
4. LiepU Instructor Education Development Plan for 2018–2023;
5. The World Bank report 'International Trends and Good Practices in Internal Financing and Governance of Higher Education' (available at: [https://www.izm.gov.lv/lv/petijums-par-augstakas-izglitibas-parvaldibu-sadarbiba-ar-pasaules-banku/starptautiskas\\_tendences\\_un\\_laba\\_prakse\\_augstakas\\_izglitibas\\_iekseja\\_finansesana\\_un\\_parvaldiba1\\_0.pdf](https://www.izm.gov.lv/lv/petijums-par-augstakas-izglitibas-parvaldibu-sadarbiba-ar-pasaules-banku/starptautiskas_tendences_un_laba_prakse_augstakas_izglitibas_iekseja_finansesana_un_parvaldiba1_0.pdf) - in Latvian <https://openknowledge.worldbank.org/bitstream/handle/10986/29739/125532-v2-WP-PUBLIC-P159642-World-Bank-support-to-higher-education-in-Latvia.pdf?sequence=1&isAllowed=y> - in English);
6. For projects under the European Union's Structural Fund and Cohesion Fund 2014–2020 planning period and the Growth and Employment activity programme of the European Social Fund and the European Regional Development Fund:
  - specific support objective 'Reduce fragmentation of study programmes and strengthen resource sharing',
  - specific support objective 'Strengthening of academic staff of higher education institutions in strategic specialist fields',
  - specific support objective 'Ensuring better management in higher education institutions',
  - specific support objective 'Increase the scientific and innovative capacity of Latvia, with the capability of attracting foreign financing, investing human resources and infrastructure' measure 'Support post-doctoral research',
  - specific support objective 'Increase the scientific and innovative capacity of Latvia, with the capability of attracting foreign financing, investing human resources and infrastructure' measure 'Support international cooperation projects in research and innovation', etc.

**2. The Liepaja University Academic Staff Development Plan for 2018–2022** is a plan for developing and hiring staff, which defines and describes the planned activities for the improvement of academic staff competence, hiring, and growth.

The aim of the Liepaja University Academic Staff Development Action Plan for 2018–2022 is to improve the competences and skills of the Liepaja University academic staff, to facilitate the growth of the staff, and to promote Liepaja University activities, in accordance with quality requirements.

The Liepaja University Academic Staff Development Plan for 2018–2022 was developed in accordance with:

1. LiepU Constitution (available at: <https://www.liepu.lv/lv/172/satversme>);
2. LiepU Development Strategy for 2016–2020 (available at: [liepu.lv/uploads/files/LiepU\\_strategija\\_2020\\_majas%20lapai.pdf](https://www.liepu.lv/uploads/files/LiepU_strategija_2020_majas%20lapai.pdf));
3. LiepU Human Resources Development Plan for 2018–2023;
4. LiepU Teacher Education Development Plan for 2018–2023
5. Liepaja University Research Activity Strategy for 2015–2020 (available at: [https://www.liepu.lv/uploads/files/LiepU%20Zinatniskas%20darbibas%20strategija\\_2015\\_2020.pdf](https://www.liepu.lv/uploads/files/LiepU%20Zinatniskas%20darbibas%20strategija_2015_2020.pdf));

6. For projects under the European Union's Structural Fund and Cohesion Fund 2014–2020 planning period and the Growth and Employment activity programme of the European Social Fund and the European Regional Development Fund:

- specific support objective 'Reduce fragmentation of study programmes and strengthen resource sharing',
- specific support objective 'Strengthening of academic staff of higher education institutions in strategic specialist fields',
- specific support objective 'Ensuring better management in higher education institutions', etc.

### **3. LiepU Management Staff Training Plan for 2018–2021 defines and describes the expected competence development activities for management staff.**

The LiepU Management Staff Training Plan objectives are: increase the competences and skills of the LiepU management staff for capacity in management, for process management, for having a management team with a vision of a modern, competitive international university that understands global trends, a management team that can inspire students and staff for rapid and ambitious growth. The LiepU Management Staff Training Plan was developed in accordance with:

1. LiepU Constitution (available at: <https://www.liepu.lv/lv/172/satversme>); (Latvian only)
2. LiepU Development Strategy for 2016–2020 (available at: [liepu.lv/uploads/files/LiepU\\_strategija\\_2020\\_majas%20lapai.pdf](http://liepu.lv/uploads/files/LiepU_strategija_2020_majas%20lapai.pdf)); (Latvian only)
3. LiepU Human Resources Development Plan for 2018–2023 (available at: <https://kvs.liepu.lv/d.php?f=69cb2503429e9a5ae47cfe825f242f8ef534684c>); (Latvian only)
4. The World Bank report 'International Trends and Good Practices in Internal Financing and Governance of Higher Education' (available at: [http://www.izm.gov.lv/lv/images/izglitiba\\_augst/Pasaules\\_Banka/Starptautisk%C4%81s\\_tendences\\_un\\_laba\\_prakse\\_augst%C4%81k%C4%81s\\_izgl%C4%ABt%C4%ABbas\\_iek%C5%A1%C4%93j%C4%81\\_finans%C4%93%C5%A1an%C4%81\\_un\\_p%C4%81rvald%C4%ABb%C4%81.pdf](http://www.izm.gov.lv/lv/images/izglitiba_augst/Pasaules_Banka/Starptautisk%C4%81s_tendences_un_laba_prakse_augst%C4%81k%C4%81s_izgl%C4%ABt%C4%ABbas_iek%C5%A1%C4%93j%C4%81_finans%C4%93%C5%A1an%C4%81_un_p%C4%81rvald%C4%ABb%C4%81.pdf));

For projects under the European Union's Structural Fund and Cohesion Fund 2014–2020 planning period and the Growth and Employment activity programme of the European Social Fund and the European Regional Development Fund:

- specific support objective 'Reduce fragmentation of study programmes and strengthen resource sharing',
- specific support objective 'Strengthening of academic staff of higher education institutions in strategic specialist fields',
- specific support objective 'Ensuring better management in higher education institutions'.

In the context of this study plan, the LiepU management staff include the rector, vice-rectors, deans, heads of scientific institutes, unit heads/specialists, heads of fields of study, head of study programmes, their deputies, and members of Liepaja University decision-making bodies.

In addition to the existing human resources development plans of LiepU, the needs of professional competence development are/can be identified based on the results of employee performance and competence assessment, and/or independent individual interviews, as a result of which the existing education and competences of LiepU academic and general staff are/can be supplemented through internships, new knowledge, improving the level of education, attending courses, seminars, conferences, congresses, forums, participating in Erasmus+ mobility activities, and other events for sharing experience.

### **Added value of the measures used for conducting the study process and improving the**

### **quality of the studies:**

Students are also offered internships in a specific work environment, to develop their practical competences, which require not only knowledgeable teaching staff who keep up to date with the latest theoretical developments, but also practitioners who are familiar with current issues at local, national, and international level.

In order to promote the development of practical competences of the teaching staff within the framework of CDM project 8.2.2 (specific support objective 'Strengthen the academic staff of higher education institutions in strategic specialisation fields'), several instructors involved in the implementation of the field of study participate in upskilling activities as part of internships in various companies in Latvia. For example, A.Jansone did so at Emergn Latvia, Dz.Tomsons and I.Znotiņa, at Giraffe360.

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

The staff members involved in the study programmes of the field of study are listed in attached file **ITvirziena\_macibspeki\_EN.xlsx**, indicating the degree and/or professional qualifications, position, elected/non-elected status of the staff member, and the courses taught in the study programmes in question. Their scientific CVs are enclosed in attached file **CV\_ITvirziena\_macibspeki\_EN.pdf**

**55** LiepU instructors are involved in the implementation of the study programmes of the field of study, of which **29** (53%) have doctoral degrees, and **26** (47%) have master degrees, while **21** (39%) instructors are elected to academic positions at LiepU.

Many faculty members are involved as researchers and senior researchers in the scientific activities of the Institute of Science and Innovative Technologies (ISIT). A list of scientific publications in peer-reviewed journals by the instructors and their other scientific achievements that characterise the professional competence of the academic staff involved in the field of study in the teaching of their courses is provided in attached file **MacibspekuPublikacijas\_EN.pdf**

Research topics of faculty academic staff members is related to technologies and their applications, software engineering, e-study technology, as well as teaching methodology of mathematics, computer science and physics. In cooperation with academic staff of Environmental Science several interdisciplinary studies on the topics of renewable energy resources, circular economy and environmental modeling has been completed.

Several teaching staff members have taken the opportunity to go on various mobility events to partner universities abroad, and every academic year, LiepU students and teaching staff are visited by instructors from foreign partner universities. However, faculty members do not make sufficient use of ERASMUS mobility, which is explained by their workload in projects and studies.

### **2.3.8. Assessment of the support available for the students, including the support provided during the study process, as well as career and psychological support by**

**specifying the support to be provided to specific student groups (for instance, students from abroad, part-time students, distance-learning students, students with special needs, etc.).**

The general staff of the FSE is available as support staff for students during their studies, providing information to full-time and part-time students regarding the management of the study process, and in the case of any questions, acquainting and informing them about various activities related to the management of the study process or improvements that are constantly taking place at LiepU, such as the automatic registration system for studies, electronic application for scholarships, etc.

Students can apply for various types of scholarships, such as the Senate scholarship or a one-off semester scholarship. A legal advisor is available for LiepU students in the case of any uncertainties, e.g. if an individual study schedule is necessary, or issues related to study agreements for foreign students.

Liepaja University has a Psychological Support Centre, which can provide counselling for psychological issues, and Liepaja University provides access for people with restricted mobility, including those wheelchairs, as special ramps are installed and one can move between the floors of the Liepaja University building using a lift.

The Student Council works on the support and integration of students at LiepU, and the workers of the International Relations Team function as mentors for foreign students throughout their study period.

For the continuous support of the study process, students can use the Moodle learning environment, the literature provided by the library, as well as computer rooms and group work rooms.

LiepU faculty members provide consultations to students on the preparation of scientific papers, and the preparation of presentations during classes, and for consultations with their instructors. Also, in preparation for scientific conferences at LiepU and other universities, competitions that are regularly announced in various fields (for example, economics, business), students can receive additional consultations from the teaching staff.

The staff members providing some of the highest amounts of support throughout the period are the study programme heads, who help students integrate into university life, advise them on choosing companies for internships, organise study trips to different organisations and companies during the study process, etc.

At the Faculty of Science and Engineering, Dean's assistant Antra Sinka maintains a large part of the overall communication with students - she informs about extracurricular events, about addition (unplanned) consultations and seminars related to study projects and final theses, and advises on internship opportunities. Foreign students are frequent guests of Antra Sinka.

In communication with international students, the staff of the LiepU Department of International Relations is invaluable. They inform students both about the organization of studies at the university in general, and help to solve certain domestic problems (information about doctors, residence documentation, visa, etc.)

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

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

Scientific research at the faculty is carried out in accordance with the Liepaja University Research Activity Strategy for 2015–2020 ([https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja\\_University\\_Development\\_Strategy\\_Summary\\_2016-2023\\_25.01.2021.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Liepaja_University_Development_Strategy_Summary_2016-2023_25.01.2021.pdf)), which sets the following medium-term strategic goals:

- the research topics are in line with the national priorities (of the national research programme), internationally relevant research areas, and regional development needs (orders by local governments, regional businesses, etc.);
- the LiepU research institutes and faculty research groups represent creative teams performing national and international collaborative research, forming a national and international network for the implementation of research projects in relevant research topics;
- LiepU has interdisciplinary research groups solving complex scientific problems in cooperation with Latvian and foreign universities and businesses, which are involved in obtaining funds from national and international projects to achieve their results;
- the collaboration between research and business is supported by the Prototyping Centre. Cooperation with the Kurzeme Business Incubator and Liepaja University Science and Innovation Park is used for the implementation and commercialisation of research by students and young scientists;
- the publication of research results at international level (international conferences and congresses, internationally cited journals) rises;
- Liepaja University scientific journals and magazines are included in databases of internationally cited publications;
- Promoting science and research in conjunction with all social partners, all age and social groups, in particular by building cooperation with schools, creative and professional organisations, encouraging youth interest in science and understanding scientific activity and creativity as the basis for a successful career in any field of activity.

Scientific and research (creative) activities take place in accordance with the annual plan approved by the Liepaja University Senate. An overview of the scientific and creative activities of the academic staff during the period covered by the self-assessment report is available in the Latvian National Information System of Scientific Activity ZDIS, at: [https://sciencelatvia.lv/#/pub/institucijas\\_publ\\_parskats/254278](https://sciencelatvia.lv/#/pub/institucijas_publ_parskats/254278) (Latvian only)

The peers body governing scientific activity and research is the Science Council, which, according to Article 18 of the Liepaja University Constitution, is responsible for the organising and coordination of scientific research in all fields of science relevant to Liepaja University. LiepU Science Council also coordinates the publication of scientific and teaching literature produced by all faculties and scientific institutes through the publishing house LiePA. The publishing of education and scientific literature is financed through projects, natural individuals, and legal entities, and using the funds earmarked for publishing in LiepU's main budget.

The LiepU main budget is used to create a fund for the development of scientific activity, which aims to increase the number of internationally cited publications and monographs, to support

participation in international conferences, especially in cases when researchers or faculty members do not have project funding. The size of the fund varies from year to year, it does not fully fund all applications, but it has contributed to the stability of internationally citable publications in several research areas of LiepU, including information technology, mathematics, physics, material sciences, and mechatronics.

Academic staff and students in the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science are also actively involved in research activities of ISIT, as part of various projects. The main research activities of the academic staff and doctoral students are shown in Table 2.4.1.1.

Table 2.4.1.1.

**The main research topics of the academic staff in the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science**

<i>No</i>	<i>Topics</i>	<i>Instructors</i>
1.	Modern elementary mathematics and teaching of mathematics. Maths competitions for schoolchildren and work with gifted children	Dace Kūma
2.	Multi-criteria optimisation problems in economics and technical diagnostics	Šarifs Guseinovs
3.	Solution methods for a number of inverse linear and non-linear problems in mathematical physics	Šarifs Guseinovs
4.	Physical/mathematical models and corresponding analytical and numerical methods for the controlled formation of periodic nanostructures in solid metals, semiconductors, and dielectric surfaces under exposure to femtosecond-long pulses of laser	Šarifs Guseinovs
5.	Physical mathematical models to adequately describe the formation and behaviour of solid nanoparticles on metal and semiconductor surfaces	Šarifs Guseinovs
6.	E-learning technologies and governance	Anita Jansone
7.	Software testing and quality	Anita Jansone

8.	Oceanographic modelling of the Baltic Sea and lakes (EVIDEnT national research programme <a href="http://vpp-evident.lv/index.php/lv/">http://vpp-evident.lv/index.php/lv/</a> )	Vilnis Frišfelds
9.	Monte Carlo modelling of multiparticle systems and study of critical phenomena	Jevgeņijs Kaupužs
10.	Computer Science. Semantic networks	Guntars Būmans
11.	Computer-supported collaboration of students in combined studies using information and communication technologies at Liepaja University	Lāsma Ulmane-Ozoliņa
12.	Materials research for energy storage devices. Research of the physical properties of thermal insulation materials	Uldis Žaimis
13.	Anaerobic biogas production using seaweed	Uldis Žaimis

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

Doctoral students, master students and students of the field of study Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management, and Computer Science are actively involved in research activities, working in projects and participating in conferences; their results are reflected in study projects, course papers, bachelor theses, diploma projects, master and doctoral theses, and in the content of study courses. Every year, the Faculty of Science and Engineering of LiepU organises scientific readings for students and master students. During the COVID-19 pandemic in 2020 and 2021, the conference was held remotely using Microsoft Teams. Several students of the field of study have successfully participated in creative and research competitions during the reporting period, for example, in 2021:

- Klaipeda State University of Applied Sciences International Physics and Mathematics Competition KNOW-CALCULATE-MEMORIZE 2021 (14 April 2021): 2nd place taken by 3rd year student of the IT bachelor study programme Mārtiņš Ābelītis, and 2nd year student of the Teacher (Mathematics Teacher) vocational bachelor study programme Alise Šitina;
- LMT IoT Hackathon (14-16 May 2021): students of the study programme in Mechatronics Rihards Grudzinskis, Sebastians Štāls-Aploks, Janis Dunkers;
- Injui hackathon in Brazil (23 May 2021): students of the study programme in Mechatronics J.Dunkers, S.Štāls-Aploks;

- RTU 'Papīra tilti' (Paper Bridges) (12 March 2021): S. Štāls-Aploks, 1st place; J. Dunkers, 2nd place; R. Grudzinskis, 4th place;
- Kings projects (Start-UP School Cycle 5): Team 1: A. Zauka and J. Dunkers; Team 2: S. Štāls-Aploks;
- Liepāja Society of the Blind project: U. Uvārovs (August–September 2021);
- Participation in student research projects: J. Dunkers, S. Štāls-Aploks.

The scientific research of the academic staff involved in the field of study is related to the subject matter and content of the courses taught. This is reflected in the topics of the conference papers and publications. The activities of instructors in research projects during the reporting period have been the basis for changes in the content of courses (e.g. Algorithms and Data Structures, Current Topics in Software Engineering, Internet Technologies, Software Testing, etc.) and the creation of new courses (e.g. Internet of Things, Applications of Artificial Intelligence, Data Processing Systems, Software Project and Data Quality, etc.). Based on the FSE's smart specialisation fields, modules on artificial intelligence and smart technologies (10 credits each) were developed for the bachelor and master study programmes in IT. These modules will build on the results and lessons learned from the FSE and ISIT studies. At the same time, these modules provide opportunities for students to engage in FSE and ISIT research projects. The interrelated content of the study programmes implemented by the FSE makes it possible to form interdisciplinary teams, involving students of the field of study, and students from the Environmental Protection field of study, in the implementation of study and ISIT research projects.

The bachelor and master theses of the students tackle innovative topics and bring up practically applicable results in connection with the scientific activity of the teaching staff.

Research and development projects funded by the Latvian national budget (including structural funds) through a competitive process. Names of R&D contracts, including R&D contracts with companies, public entities (government, municipalities, etc.) and other customers (natural individuals, associations, foundations, etc.).

Project funding provider	Project name and identification No	Project participants at LiepU (academic staff, students, support staff)
LIAA	LIAA voucher project No VP-V-2020/64	Mg. sc. ing. Uldis Žaimis
2021 results	In conjunction with SIA ABLabs. Development of electronics and software for Artusystem Dual-Fuel engines, with volumes of 0.8 to 3.0 l	
LIAA	LIAA voucher project No VP-V-2020/75	Mg. sc. ing. Uldis Žaimis
2021 results	In conjunction with SIA apedd: development of a new and innovative concept for a snack bar production line, identification of the best hydrophobic coatings and cooling options	
LIAA	LIAA voucher project No VP-V-2021/58	Mg. sc. ing. Uldis Žaimis
2021 results	In conjunction with SIA Motors HOH: engine modelling and duty cycle calculations for an innovative hydrogen technology	

LIAA	LIAA voucher project No VP-V-2021/85a	Mg. sc. ing. Uldis Žaimis
2021 results	In conjunction with Global Wolf Motor: industrial design for an electric scooter vehicle	
LIAA	LIAA voucher project No VP-PI-2021/60a	Mg. sc. ing. Uldis Žaimis
2021 results	In collaboration with HyMet: development of innovative heat transfer liners	
LAD	WOODPECKER	Mg. sc. ing. Uldis Žaimis
2021 results	In cooperation with the Riga High Tech: a prototype of WOODPECKER, an electric wooden car prototype.	
Liepāja City Council	NGO social inclusion project 'Palīdzēsim cits citam, iedrošinot un praktiski atbalstot' (Let's Help Each Other through Encouragement and Practical Support) No 26/2.8.5	Dr. biol. M. Zeltina, Mg. sc. ing. Uldis Žaimis
2021 results	Liepāja Society of the Blind together with LiepU: Informative study on the suitability and changing of the colour of assistive devices (white cane) for blind people	
LIAA	<a href="#">Growth and employment; innovation voucher for measure 1.2.1.2 'Support for improving the technology transfer system' of specific support objective 1.2.1 'Increase private sector investment in R&amp;D'</a>	Dr. sc. ing. Armands Grickus
2020 results	SIA LIEPĀJAS RAS Experimental development of a new product that will lead to the production of a prototype shredder/mixer for 2-3 types of insulation materials (bulk material, sheets), and the development of optimal formulas. Completion of the experimental development project (voucher), in which a prototype of thermal insulation material (Fibrols) was developed for SIA Liepājas RAS.	
State research programmes (VPP)	'Future technologies for resilient and secure services' (VPP-Covid-2020/1-0009).	A. Jansone L. Ulmane-Ozoliņa

2020 and 2021 results	<p>Within the framework of the national research programme to combat the consequences of COVID-19, the Institute of Information Technology of Riga Technical University together with partners from the University of Latvia, Vidzeme University of Applied Sciences, Rezekne Academy of Technologies and <b>Liepāja University</b> implemented the project ARTSS between 1 July 2020 and 31 December 2020 (extended to 31 March 2021): ‘Future technologies for resilient and secure services’.</p> <p>Liepāja University researchers Anita Jansone and Lāsma Ulmane-Ozoliņa participate in a work group that prepares and adapts study courses for the TELECI experiment, researching how to learn more effectively in an e-learning environment. It is a tool that monitors user behaviour in an e-learning environment to see if the material taught is too complex, and can predict when one may start to have difficulties with the material and need support.</p> <p><a href="https://artss.mii.lv/">https://artss.mii.lv/</a>  <a href="https://artss.rtu.lv/">https://artss.rtu.lv/</a>  <a href="https://jauns.lv/raksts/zinas/419220-liepajas-universitates-petnieki-izstrada-jaunu-metodiku-attalinatam-acibam">https://jauns.lv/raksts/zinas/419220-liepajas-universitates-petnieki-izstrada-jaunu-metodiku-attalinatam-acibam</a>  <a href="https://www.liepu.lv/uploads/atteli/projekti/ARTSS_A2.jpg">https://www.liepu.lv/uploads/atteli/projekti/ARTSS_A2.jpg</a></p>
	<p>The project results have been used in the IT bachelor course Current Topics in Software Engineering and the IT master course General Quality Management (analysis of best practices in software development)</p>
LIAA	<p>‘Research and development of self-cleaning superhydrophobic and superhydrophilic nanocoatings for photovoltaic converters and solar thermal collectors’, No KC-PI-2020/36</p> <p>Š. Guseinovs (scientific project leader), Jekaterina Aleksejeva (lead researcher), Jevgenijs Kaupužs (lead researcher), Anita Jansone (lead researcher), Dace Kūma (lead researcher), Uldis Žaimis (researcher)</p>
2019 results	<p>Research and development of self-cleaning superhydrophobic and superhydrophilic nanocoatings for photovoltaic converters and solar thermal collectors.</p>
2020 results	<p>Implementation of Phase 1 of the project: commercialisation of research results</p>
	<p>The project benefits have been used in the study projects of the bachelor programme Mechatronics and have formed the basis for new study projects in the bachelor programme Smart Technologies and Mechatronics</p>

Latvian national budget	2014–2017 national research programmes: ‘Next Generation of Information and Communication Technologies (ICT) National Research Programme (NexIT)’, <a href="http://www.lumii.lv/resource/show/836">http://www.lumii.lv/resource/show/836</a>	University of Latvia; Riga Technical University; Institute of Mathematics and Computer Science of the University of Latvia; Venstpils University of Applied Sciences, Transport and Telecommunication Institute, <b>Liepaja University</b> , programme leader Dr.sc.comp. A. Ambainis (LU)
Latvian national budget	Project No 4.4: ‘Mathematical modelling, inverse analytical problem solving methods and algorithms oriented towards data parallel processing technologies’ ( <b>Liepaja University</b> ), <a href="https://sites.google.com/site/sharifguseynov/the-state-research-program-nexit">https://sites.google.com/site/sharifguseynov/the-state-research-program-nexit</a>	Dr. math. <b>Šarifs Guseinovs</b> (leader), Dr. biol. <b>Jekaterina Aleksejeva</b> , Dr. phys. <b>Jevgenijs Kaupužs</b>
2016–2018 results	<ol style="list-style-type: none"> <li>1. Development of mathematical models and methods: <ul style="list-style-type: none"> <li>• 11 mathematical models</li> <li>• 5 analytical methods</li> <li>• 2 analytical/numerical algorithms</li> <li>• 8 original scientific articles</li> <li>• 1 research brochure</li> </ul> </li> <li>2. Participation with five papers in three international and one national conferences</li> <li>3. Two publications in conference proceedings</li> <li>4. A workshop was organised on ‘<i>The use of mathematical modelling and information technologies to solve scientific, technical, technological, economic, financial, environmental, socio-humanitarian problems</i>’, including seven presentations.</li> </ol>	
The results of the project have been used in IT master programme projects and in the course High Performance Computing (examples of practical assignments)		

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

FSE and ISIT staff are actively involved in research and development projects under the European Union Framework Programme and other international R&D research projects. The most important national and international research projects carried out during the reporting period are listed in Table 2.4.3.1.

Table 2.4.3.1.

Project funding provider	Project name and identification No Project results Study programmes benefiting from the project	Project participants at LiepU (academic staff, students, support staff)
DIGITAL 2021	DIGITAL-2021-EDIH-INITIAL-01	A. Jansone U. Žaimis Dz. Tomsons
Horizon 2020	Twinning in Environmental Data and Dynamical Systems Modelling for Latvia (TED4LAT)	L. Ulmane-Ozoliņa A. Jansone
Eurostars 3: Call 2	Versatile gas analyser for AI driven biofuel production	U. Žaimis
Interreg Baltic Sea Region (2018–2020)	Improving smart specialisation implementation of the Baltic Sea Region through orchestrating innovation hubs (Smart-up BSR, No #R044).	L. Ābele A. Jansone
<p>The project's deliverables can be found at: <a href="https://smartup-bsr.eu/">https://smartup-bsr.eu/</a>            Project seminars were organised in:            Estonia, Tallinn (17–19 September 2018)            Germany, Potsdam (27–30 November 2018),            Finland, Helsinki and Kotka (2–4 May 2019);            Latvia, Riga (24–26 February 2020)</p> <p>Solutions were developed in the following subjects:  <b>Challenge 1</b> (Ministry of Economy) Long-term cooperation between business, academia and public sector to foster innovation  <b>Challenge 2</b> (University of Latvia) Promoting the communication between the holders and users of the science infrastructure  <b>Challenge 3</b> (University of Latvia) Organisation and financing of the innovation development and marketing  <b>Challenge 4</b> (Ministry of Education and Science) Human resources development, mobility and cooperation in the science  <b>Challenge 5</b> (Liepaja University) Use of the innovative digital approaches to educating the public in the circular economy</p>		
<p>The results of the project have been used in the IT bachelor course Software Project and Data Quality and the IT master course General Quality Management</p>		

<p>Interreg (2014–2020)</p>	<p>Project No R0 'Growing Algae Sustainably in the Baltic Sea' (GRASS) co-funded by the Baltic Sea regional programme</p>	<p>A. Grickus, R. Jūrmaliētis</p>
<p>Research on the sustainable management of algal resources of Kurzeme coast, including algae harvesting technologies.</p>		
<p>The project benefits have been used in the study projects of the bachelor programme Mechatronics and have formed the basis for new study projects in the bachelor programme Smart Technologies and Mechatronics</p>		
<p>EEA/N Research and Education grant programme(2020)</p>	<p>Project 'Development of an innovation centre in Liepāja' (No NFI/IC/VIAA/2020/2)</p>	<p>LiepU: R. Jūrmaliētis, A. Elstina</p>
<p>The improvement of the Nature House and the creation of a co-working space in it began as part of the project, and will complement the Science and Education Innovation Centre (ZIIC) with its modern exhibits, technologies, and equipment, as well as new interest-based education programmes. The development of an innovation centre in Liepāja will foster the improvement of knowledge, practical skills and competences among pre-school children, schoolchildren, and school teachers in STEM and environmental fields.</p>		
<p>The results of the project have been (and will continue to be) used in study projects in all the study programmes of the field of study.</p>		
<p>Eurostar2 (2020–2021)</p>	<p>Ultra-portable continuous emission monitoring system E! 113993 - UP-CEMS</p>	<p>Uldis Žaimis, Anita Jansone, Dzintars Tomsons, Rodrigo Gruntmanis, Valdis Priedols, Šarifs Guseinovs</p>
<p>Ultra-portable continuous emission monitoring system</p>		
<p>The project's results have been used for R. Gruntmanis' master thesis in IT, and V. Priedols' PhD thesis.</p>		
<p>Horizon 2020 (2018–2019)</p>	<p>European Researchers' Night in Latvia (NIGHTLV-2018-2019)</p>	<p>Dz. Tomsons, U. Žaimis, I. Znotiņa, A. Jansone, M. Žigunovs, D. Kūma, D. Barute, V. Priedols, R. Gruntmanis</p>
<p>STEM science promotion events were organised for schoolchildren and adults, with a seminar on the practical importance of indoor mini-ecosystems, open classes on algorithm building for Lego Mindstorms EV3 robots and computer programming algorithms, presentations of the results of IT student research papers.</p>		
<p>The organising of the Researchers' Night events only involved students from all study programmes of the field of study.</p>		

EU (2019–2022)	Development of Liepaja University academic staff in strategic specialisation fields: nature sciences, mathematics and information technologies, arts, social sciences, business, and law (No 8.2.2.0/18/A/021)	Dz. Tomsons, V. Priedols, K. Mackare, L. Alksne, R. Načeva
<p>Internships (200 hours) for instructors at IT companies:</p> <ul style="list-style-type: none"> <li>- Dz. Tomsons: Giraffe360;</li> <li>- A. Jansone: Emergn Latvia;</li> <li>- I. Znotina: Giraffe360;</li> <li>- D. Barute: BPO Service</li> </ul> <p>Doctoral students V. Priedols, K. Mackare, and L. Alksne were involved in the study process as teaching staff A long-term contract signed with foreign lecturer R. Nachev from Bulgaria</p> <hr/> <p>Instructors of all study programmes have used the knowledge and experience gained during the internships to improve their study courses and projects</p> <p>The academic staff of IT bachelor and master degree programmes has been expanded with new colleagues—doctoral students and a foreign instructor.</p>		
EU (2016–2018)	Baltic Info Campaign on Hazardous Substances	LiepU: O. Glikasa, L. Karule
<p>Approval of the materials developed as part of the project in schools. Supplementing and preparing materials for a new teaching publication</p>		
European Union Structural Fund project (2009–2015)	<i>Development of Doctoral Studies at Liepaja University</i> (1DP/1.1.2.1.2./09/IPIA/VIAA/018).	Project leader: Dr.sc.comp. <b>A. Jansone</b>
<p>Doctoral programme in E-Learning Technologies and Governance</p>		
European Union Structural Fund project (2011–2015)	<i>Support for the Implementation of Master Studies at the Liepaja University</i> (2011/0019/1DP/1.1.2.1.1.1./11/IPIA/VIAA/003)	Project leader: Mg.philol. G. Pūce
<p>Vocational master study programme in Information Technology</p>		
European Regional Development Fund project (2010–2015)	<i>Establishment of a Basic Single National Academic Network for Scientific Activities</i> (2010/0239/2DP/2.1.1.3.2./10/IPIA/VIAA/001)	Project leader: Mg.sc.comp. <b>Dz. Tomsons</b>
<p>Improved infrastructure for research-based studies in all study programmes of the field of study</p>		
European Economic Area financial instrument (2014–2016)	<i>Development of a Climate Change module at Liepaja University</i> (2/EEZLV02/14/GS/044/011)	Project leader: Dr.biol. <b>M. Zeltiņa</b> Researchers: Mg. I. Javaitis, Mg. M. Žigunovs, etc.
<p>The project benefits have been used in the study projects of the bachelor programme Mechatronics and have formed the basis for new study projects in the bachelor programme Smart Technologies and Mechatronics</p>		

The future plans for the development of international cooperation in research are related to the attraction and implementation of fundamental and applied research projects co-financed by European Union funds in the fields of competence and research interests of the academic staff of the Faculty of Science and Engineering (FSE), i.e., data analysis and processing, smart technologies, mathematical modeling, e-learning technologies, applications of artificial intelligence and machine

learning, etc. For example, in order to ensure the advanced research development in the fields of data analytics and dynamic modeling, academic staff members of FSE have designed joint Horizon Europe Programme project TED4LAT. This project will strongly upgrade data analytics and dynamic modelling research in doctoral programmes. We are cooperating with Vidzeme University of Applied Sciences, RTU, University Politecnico di Torino, Institut National de Recherche Pour L'Agriculture, L'Alimentation et L'Environnement (INRAE).

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

Measures to motivate academic staff to pursue research activities are linked to opportunities to engage in interdisciplinary research, applied research, and collaborative projects, as well as challenges in their implementation and cooperation with ISIT. The university's system for allocating funding contributes to this support, based on the scientific results achieved within the departments.

The fields of research of the FSE are discussed and defined in the open and extended meetings of the Faculty Council, during the general meetings of the faculty staff, and in the individual instructor work groups. The individual academic interests of instructors are encouraged, guided and aligned with the research areas identified by the FSE and ISIT. Mutual cooperation in the implementation of applied research and the involvement of students in it among the teaching staff activates the creative processes at the faculty.

16 projects (2 VPP, 6 innovation vouchers, 1 commercialisation of research results, 2 Intereg, 2 Nord, 3 specialised projects) were implemented in 2019–2021. The implementation of 1 horizon project continues in 2021–2023. 2 horizon projects and an EDIH project were approved in 2022

Information about publications by LiepU teaching staff: <https://www.liepu.lv/lv/publik%C4%81cijas>

A list of publications by teaching staff during the last six years is provided in the attached file **MacibspekuPublikacijas\_EN.pdf**

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

The integration of the results of research and creative activities of the academic staff in the study process enables the improvement of the content of study programmes and promotes research activities among the students. The research activities of the instructors are included as an innovation in the content of study courses, while the prepared teaching aids facilitate the study course learning and help organise independent work more successfully.

Integration of student research work with the research activities of the academic staff, whereby the integration of the research activities of academic staff in the study process is manifested in the implementation of the research methods and findings of their research and research/teaching publications in practice, in offering appropriate topics for bachelor and master theses to students, and in the familiarisation of students with the use of research methods in the preparation of these theses. The research topics and research activities of students in the field of study reveal the current national and regional problems in the field of data processing, information services, and technology applications. Research is planned in terms of content and organisation, based on the specific features of the study programmes, and reflects the specific aspects of technology and engineering pertaining to the objectives of the study programme.

The linking between student research and the scientific activities of the teaching staff is systematically worked on and improved. The bachelor and master theses of the students tackle innovative topics and bring up practically applicable results in connection with the scientific activity of the teaching staff.

Every year, the Science Council of the University of Liepāja (LiepU) announces the annual student research project award. Its aim is to promote student involvement in scientific activities, to promote the acquisition of experience in the development of creativity and research projects, as well as student participation in solving current problems (<https://liepu.lv/lv/jaunumi/4571/studentus-aicina-pieteikt-petniecibas-projektu-konkursam>). Students of both bachelor's and master's study programs are invited to apply to award.

For example, in 2021, six applications by students of the Faculty of Science and Engineering (FSE) were submitted. All applications received funding for implementation of their projects (<https://liepu.lv/lv/jaunumi/4274/studenti-sanem-atbalstu-petniecibas-projektu-konkursa>; Latvian only). In 2020, five research projects of FSE students received funding in the competition of student research projects of the University of Liepāja. (<https://liepu.lv/lv/jaunumi/3924/nosledzies-studentu-petniecibas-projektu-konkurs>; Latvian only). In 2018, three FSE student projects were submitted (<https://liepu.lv/lv/jaunumi/3596/studenti-sanem-atbalstu-petniecibas-projektu-konkursa>; Latvian only). In 2018, three FSE student projects were submitted. (<https://liepu.lv/lv/jaunumi/2798/nosledzies-studentu-petniecibas-darbu-projekts> Latvian only).

The students of the Faculty of Science and Engineering have actively and with good results participated in the Inventions and innovations event MINOX organized by the Latvian Academy of Sciences in 2022, 2020 and 2018:

<https://liepu.lv/lv/jaunumi/4563/liepajas-universitates-studenti-sanem-atzinibu-minox-kurzeme-2022> (Latvian only);

<https://liepu.lv/lv/jaunumi/3937/piedalamies-izgudrojumu-un-inovaciju-izstade-minox-2020> (Latvian only);

<https://liepu.lv/lv/jaunumi/3938/sudraba-medalas-izgudrojumu-un-inovaciju-izstade-minox-2020> (Latvian only);

<https://liepu.lv/lv/jaunumi/3204/liepu-students-un-profesors-iegust-medalas-7-starptautiska-izgudrojumu-un-inovaciju-izstade-minox-2018> (Latvian only).

Every year in the spring semester, the Faculty of Science and Engineering organizes the Student Scientific Conferences, where students present results of their research and study projects. For example:

• in

2021, :

<https://liepu.lv/lv/jaunumi/4071/notiks-dabas-un-inzenierzinatnu-studentu-zinatniska-konferen ce> (Latvian only);

- in 2018: <https://liepu.lv/lv/jaunumi/2604/matematikas-un-informacijas-tehnologiju-studentu-zinatniska s-konferences-ietvaros-stastis-par-neklatienes-darba-pieredzi> (Latvian only);

Every year in June, the Faculty of Science and Engineering organizes the International scientific conference "Innovations and Creativity", where doctoral and master's students have possibilities to present their research. For example, in 2022, at the 6th conference, doctoral student K. Mackare and Master student M. Šneiders presented the results of the study "Improved applicability in an automated e-material formatting tool prototype 3.0". Doctoral students of e-study technologies V. Priedols, U. Žaimis, J. Turlisova, M. Freimane, J. Petrenko also participated with presentation in this conference (<https://easychair.org/smart-program/6thICIC/>).

The project 1.1.1.5/18/I/018 "Promotion of research, innovation and international cooperation in science at the University of Liepāja" provides wide opportunities for researchers - both students and teaching staff. For example, in 2020, students of the doctoral program "E-study technologies and management" Kristīne Mackare and Jelena Turlisova participated in the IHSI 2020 conference in Modena, Italy, with the aim of sharing their research and creating collaborations (<https://liepu.lv/lv/jaunumi/3700/liepajas-universitates-petijumi-parstaveti-italijas-ihsi-starptautiskaj a-konference>; Latvian only).

In the next coming years, doctoral students will have wide opportunities to participate in the development of research in the field of data analytics and dynamic modeling within the framework of the Horizon Europe project "Twinning in Environmental Data and Dynamical Systems Modeling for Latvia (TED4LAT)". The current project will significantly improve data analytics and dynamic modeling research in the PhD program. It is going to be implemented in cooperation between LiepU, Vidzeme University of Applied Sciences, Rīga Technical University, University Politecnico di Torino, Institut National de Recherche Pour L'Agriculture, L'Alimentation et L'Environnement (INRAE).

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

The integration of the research activities of academic staff in the study process is manifested in the implementation of the research methods and findings of their research and research/teaching publications in practice, in offering appropriate topics for bachelor and master theses to students, and in the familiarisation of students with the use of research methods in the preparation of these theses. The research topics and research activities of the students in this field of study reveal current national and regional issues in data processing, software engineering, and technology applications. In terms of content and organisation, the research is planned according to the special features of the study programme, and reflects specific subject aspects of computer science, information technology, and smart technologies in relation to the objectives of the study programme. At the beginning of each academic year, students, together with the head of the programme, evaluate the research and internships already carried out as part of the study programme in order to provide guidance in determining the field of their research. Cooperation with companies already providing internships is important.

## 2.5. Cooperation and Internationalisation

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

The choice of partners for a field of study is determined by the field's orientation towards vocational higher education, and by the content of the study programmes. Most of the partnerships with IT businesses and manufacturers (mainly in the field of metalworking) within the programme is a result of active work of the heads of the study programmes, including personal contacts and the use of information provided by graduates.

The main criteria for selecting partners among businesses are: a) the sector of their business (information and communication technologies, production automation, metalworking, etc.); b) previous cooperation and the relevance of the issues to the student; c) the interest of the companies (potential contribution of LiepU students to the companies is evaluated).

The promotion of cooperation is reinforced not only by informal links with the managers of companies interested in and committed to the study programmes, but also by the written feedback received on the relevance (emphasising and justifying the importance and necessity of training specialists) and implementation (including student internship evaluations) of the programmes. Formal support is provided by cooperation agreements for each study programme.

Cooperation with employers is of particular importance in ensuring the quality of the studies, while the employment of graduates is one of the main proofs of the quality of the study programmes and the recognition of the education that the students get. Cooperation with employers and professional organisations is also promoted by the participation of employers in:

- national examination boards (e.g. defence of bachelor and master theses, defence of internship papers);
- scientific and applied conferences, including participation in annual LiepU Creativity and Science Day events, and FSE Student Conferences, with presentations;
- surveys analysing and evaluating the professional performance of students;
- providing internships for students of study programmes;
- implementation of study courses (e.g. study visits for courses in Environmental Science and Management, Use and Assessment of Environmental Technologies, etc.)
- supporting study tours and creating opportunities to learn about the activities of the companies;
- publishing results of scientific research at LiepU conferences and in collections of scientific articles.

Cooperation with employer and industry organisations has also been facilitated by the participation of their representatives in the development of the new study programme in Smart Technologies

and Mechatronics, in the preparation of proposals for the improvement and adaptation of the bachelor and master study programmes in Information Technology to the requirements of employers, and in the evaluation of the updated study programmes (e.g. Zaļo un Viedo Tehnoloģiju Klasteris, Liepājas Tehnoloģiju klasteris, Emergn Latvia, Giraffe360, Tieto Latvia, TestDevLab, S-Tech), and through regular communication with these organisations. Cooperation with representatives of employers and industry organisations will continue during the teaching of the study programmes. Cooperation with employers is of particular importance in ensuring the quality of the studies, while the employment of graduates is one of the main proofs of the quality of the study programmes and the recognition of the education that the students get.

**Internationalisation** is also an important dimension of LiepU institutional cooperation: it enables the development of study programmes and processes in accordance with the quality criteria accepted by international practice, makes it possible for instructors to expand international cooperation by participating in international study and research projects or programmes, and to attract foreign instructors. The aim of the LiepU Internationalisation Plan is to define the tasks for the internationalisation of the university, which include implementing international study programmes, attracting and selecting foreign students, pursuing international mobility, building international cooperation, and providing an international study environment. The LiepU internationalisation processes are also promoted through various ERASMUS+ exchange programmes, which expand the opportunities of students to learn from foreign institutions.

**LiepU Internationalisation Plan** was developed on the basis of the LiepU Strategy for 2016–2020 (extended to 2023). During the reporting period, FSE built up cooperation with several foreign universities. LiepU has agreement with 124 partnet universities abroad at the moment when the current self-evaluation report has been submitted (see <https://www.liepu.lv/lv/694/sadarbibas-partneri>)

The main result of cooperation with various institutions is the achievement of the objectives set for the field of study and study programmes, the most important of which are: to provide practice-based studies for the training of highly qualified IT and smart technology specialists.

The faculty and students of the Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science programme have built good partnerships with several leading national and local IT companies, manufacturing companies in Liepaja, its surroundings, and in Kurzeme municipalities, and with professional organisations: Emergn Latvia (Exigen Services Latvia), Accenture Latvian Branch, TestDevLab, Microsoft Latvia, MikroTīkls, Tilde, Lursoft IT, Tieto Latvia, Like A Coffe, ProgoTEAM, S-Tec Latvia, IT Līderis, Enters, Fantasyposh Latvia, Highfive, Passive Management, Giraffe360, DEVS.LV, Tet, UPB, SIA Lauma Fabrics, Jensen Metal, AE Partner, LSEZ SIA Lesjofor Springs LV, Silkeborg Spaantaning Baltic, SD Autocentrs, Liepājas RAS, Medzes Components, Advanced Technology Solutions, InPass, 'Ventspils nafta termināls', Donaco, SIA ITQ GROUP, SIA Linedata Services (Latvia), SIA Phone AD, SIA RED CONCEPT, SIA BaltKarts, Liepaja City Council Agency 'Liepājas sabiedriskais transports', 'Kurzemes Biznesa inkubators', 'Ventspils digitālais centrs', Latvian Chamber of Commerce and Industry, Latvian Information and Communications Technology Association (LIKTA), Microsoft IT Academy Program, Liepaja City Council, etc. Since the 2016/2017 academic year there have been effective agreements with UPB, Liepaja City Council Agency 'Liepāja sabiedriskais transports', LSEZ SIA Lesjofor Springs LV, SIA 'Medzes components', AS 'Liepājas papīrs', LSEZ SIA CALJAN -RITE-HITE, SIA Spaantagning Baltic, SIA 'Liepājas enerģija', SIA DG Termināls for dual studies as part of the vocational bachelor study programme in Mechatronics.

The cooperation takes various forms, with the partner participation in improving the content of the study programmes, guest lectures, national examinations, partner participation in student events

organised by the university, participation in the implementation of study projects and internships, etc. Representatives of AS Emergn Latvia (Exigen Services Latvia), SIA ProgoTEAM, S-Tec Latvia, Giraffe360, MikroTikls, TestDevLab, and other companies actively participated in the development of the content of the programme. Companies represented in the national examination commissions are: AS Emergn Latvia (Exigen Services Latvia), SIA ProgoTEAM, SIA 'Liepājas Skaitļošanas centrs I', SIA Tilde, SIA InPass, DEVS.LV.

IT, electronics and metalworking companies, and Liepaja City Council support (mainly with prizes) the Faculty of Science and Engineering of Liepaja University in organising events promoting IT professions among schoolchildren, with Career Days, Programmer Days, computer science and robotics competitions, programming competitions, etc.

Thanks to contracts with Liepaja companies AS 'Liepājas papīrs', Liepaja Special Economic Zone (LSEZ) SIA DG Termināls, LSEZ SIA Lesjofors Springs LV, LSEZ SIA Caljan Rite-Hite Latvia, SIA 'Medzes components', SIA Silkeborg Spaantagning Baltic, and SIA Liepājas Energija, it is possible to conduct dual studies as part of the vocational bachelor study programme in Mechatronics.

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

The LiepU internationalisation processes are also promoted through various ERASMUS+ exchange programmes, which expand the opportunities of students to learn from foreign institutions. **LiepU Internationalisation Plan** was developed on the basis of the LiepU Strategy for 2016–2020 (extended to 2023).

Cooperation with various foreign institutions is an important dimension of LiepU institutional cooperation: it enables the development of study programmes and processes in accordance with the quality criteria accepted by international practice, makes it possible for instructors to expand international cooperation by participating in international study and research projects or programmes, and to attract foreign instructors. That is determined by LiepU Internationalisation Plan developed on the basis of the LiepU Strategy for 2016–2020 (extended to 2023). The goal of the LiepU Internationalisation Plan is to define the tasks for the internationalisation of the university, which include implementing international study programmes, attracting and selecting foreign students, pursuing international mobility, building international cooperation, and providing an international study environment

Attraction of partners takes place by planning the work of the study field in synergy with the concept of strategic specialisation directions of LiepU, at the same time involving the teaching staff involved in the implementation of the study field in discussions on networking activities and project partners' discussions in relation to the strategic goals of foreign partners. Great support in attracting international partners is provided by the International Relations Department of LiepU,

which searches for possible partners. The most important criteria in the selection of cooperation partners are their compliance with the specialization of LiepU study direction and the compatibility with research interests of the academic staff'.

LiepU internationalization processes are also facilitated by various ERASMUS+ exchange programs, which expand students' opportunities to learn the experience of foreign institutions. Due to various ERASMUS+ exchange program activities, students have the opportunity to visit internships in foreign companies. For example, in framework of the Erasmus+ program, the following students had internship in companies abroad:

- in 2018/2019 – two Master students:
  - Marlons Osvins Moraes –TuaTeam, Spain;
  - Lankahaluges Menaks Madusanks Fernando – HomyHub, Ltd., Spain;
- in 2019/2020 – three IT Bachelor students and two Master students:
  - Ričards Dāvis Jansons – Klaipeda State University of Applied Science, Lithuania;
  - Nabīls Munirs (Nabeel Munir) – Expertel S.A., Spain, and Mamma marketing, Portugal;
  - Dilans Indika Senavirathna – Ekonsoft, Turkey;
  - Lankahaluges Menaks Madusanks Fernando – HomyHub, Ltd., Spain;
  - Aries Penetrantne – Pay[in], Spain;
- in 2020/2021 – five Bachelor students and seven Master students:
  - Nabīls Munirs (Nabeel Munir), Taijabs Raza Kahlons (Tayyab Raza Kahlon), Vaibhavs Ahluvalija (Vaibhav Ahluwalia )- Mamma Marketing, Portugal;
  - Ahsans Ašrafs (Ahsan Ashraf), Muhameds Dilšads (Muhammad Dilshad) - Alphatel Business 2006, Spain;
  - Pritsurindera Kaura (Preetsurinder Kaur) - UIZ Umwelt und Informationstechnologie Zentrum, Germany;
  - Vakass Ahmeds Kaisrani (Waqas Ahmad Qaisrani) - J-Tech Global, Germany;
  - Rašmi Adišešulu (Rashmi Adisheshulu) - X-23 SRL, Italy;
  - Braiens Skots (Brian Scott) - TalentWorldGroup Plc., Hungary;
  - Sampaths Madhuranga Vithaneidžs (Sampath Madhuranga Vithanage) - Encore Lab S.L., Spain;
  - Dilans Indika Senavirathna (Dilan Indika Senavirathna) - Les Chenes, France;
  - Mārtiņš Ābelītis - Re Learn S.L.R., Italy.

Academic staff members also use the opportunity to go on mobility events to partner universities abroad. For example,

- in 2020/2021, two academic staff members used the opportunities of the Erasmus+ program and went on exchange trips to foreign universities in Lithuania and Spain:
  - Uldis Žaimis – Vilnius Gediminas Technical University, Lithuania;
  - Linda Alksne –University of Valencia Spain;
- in 2019/2020, six academic staff members used the opportunities of the Erasmus+ program and went on exchange trips to foreign universities in Bulgaria, Russia, Lithuania, and Germany;
  - Dace Kūma – Ruse University, Bulgaria
  - Uldis Žaimis – Technical University Of Darmstadt, Germany;
  - Anita Jansone – Varna University of Economics, Bulgaria
  - Ieva Ozola – Varna University of Economics, Bulgaria
  - Anita Jansone – Vilnius Gediminas Technical University, Lithuania;
  - Dzintars Tomsons – Vilnius Gediminas Technical University, Lithuania;
  - Uldis Žaimis – Vilnius Gediminas Technical University, Lithuania;
  - Patriks Morevs – Nizhnevartovsk State University, Russia.

Also in previous years (since 2013) academic staff members have gone on Erasmus+ experience exchange trips to universities in Lithuania, Russia, Finland, USA, Turkey, Greece, Portugal, and Slovakia.

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

- Statistics on foreign students and teaching staff
- Statistics on outgoing and incoming student mobility (by study programme)
- Statistics on incoming and outgoing mobility of teaching staff

At the end of 2013 Liepaja University received the Erasmus+ charter for a maximum period of 7 years, thus confirming that Liepaja University's international strategy meets the requirements of the European Union.

The objectives of learning mobility are:

- to enable LiepU staff to gain knowledge and specific skills by learning from the experience and good practices of foreign partners, and to improve practical skills needed for their current work and professional growth;
- to encourage the expansion and improvement of the range and content of courses offered;
- to allow students who are unable to participate in a mobility programme to benefit from the knowledge and experience of academic staff from other European countries and of foreign guest instructors from businesses;
- to promote the exchange of knowledge and teaching practices between higher education institutions in European countries;
- to create links between universities and businesses;
- to help develop cooperation between universities and businesses;
- to motivate students and staff to join mobility, and help them prepare for the mobility period.

In accordance with the Council of Europe Convention on the Recognition of Qualifications concerning Higher Education in the European Region (1997), and approved by Rector Order No 65-v of 20 October 2014, LiepU developed the '*Application and Selection Procedure for the STUDY MOBILITY through the ERASMUS+ Exchange Programme for LiepU Students*' (<https://www.liepu.lv/en/103/application-procedure>) and the '*Application and Selection Procedure for INTERNSHIP MOBILITY through the ERASMUS+ Exchange Programme*' (<https://www.liepu.lv/lv/50/praksu-mobilitate> (Latvian only)), and '*Application and Selection Procedure for TRAINEESHIP MOBILITY through the Erasmus+ Exchange Programme in Liepu*' (<https://www.liepu.lv/en/61/documents-and-regulations> ).

Applications for Erasmus+ mobility are announced on the LiepU website in accordance with the LiepU Application and Selection Procedure for Erasmus+ Mobility of Instructors or Staff Members. (ACADEMIC PERSONNEL DEVELOPMENT ACTION PLAN for 2018-2022, page 27).

The Council for Higher Education already pointed out in its 2011 Expert Assessment by Field of Study in Latvia that in some cases staff paid more attention to the theoretical content of their subject than to developing the knowledge and skills of students for the requirements that they will

meet in potential workplaces. There is insufficient use of scientific research databases, and poor knowledge of English often limits access to different databases. Inadequate foreign language skills among the academic staff undermines the quality of study programmes. Insufficient replacement of academic staff is observed in universities outside Riga. In the current situation, university staff tend to have less practical experience, with a more academic focus ([http://www.aip.lv/ESF\\_projekts\\_publ\\_32\\_1.htm](http://www.aip.lv/ESF_projekts_publ_32_1.htm) (Latvian only))

The aim of the LiepU Internationalisation Plan is to define the tasks for the internationalisation of the university, which include implementing international study programmes, attracting and selecting foreign students, pursuing international mobility, building international cooperation, and providing an international study environment. Internationalisation is important to LiepU institutional cooperation: it enables the development of study programmes and processes in accordance with the quality criteria accepted by international practice, makes it possible for instructors to expand international cooperation by participating in international study and research projects or programmes, and to attract foreign instructors. (Liepaja University Internationalisation Plan for 2016-2020,

[https://www.liepu.lv/uploads/files/LiepU\\_attistibas%20strategija%202016-2020\\_ar%2005\\_06\\_2017\\_IZM%20apstiprinajumu.pdf](https://www.liepu.lv/uploads/files/LiepU_attistibas%20strategija%202016-2020_ar%2005_06_2017_IZM%20apstiprinajumu.pdf) (Latvian only))

In the long run, hiring foreign instructors is an opportunity to establish, expand, and strengthen long-term international contacts with partner universities, to conduct joint scientific research, to participate in international scientific research projects. This could create interest and motivation among LiepU academic staff to teach or conduct research work in foreign universities for at least one semester.

It would also increase the number of academic staff actively participating in Erasmus+ activities, and it would encourage networking, which is very much about establishing and maintaining international relations. Networking makes it possible to establish new contacts with industry professionals and share experience, to promote the exchange of experience and good practices between Latvian and foreign university experts through a structured consultation and interaction process, to create examples of good practice, and summaries of their practical implementation experience, which can be adapted to the Latvian situation, in particular to Liepaja University.

IT students, especially full-time international students, have been actively involved in the Erasmus+ programme for the last 3 academic years. IT students mostly go on internships in foreign companies, and fewer choose exchange studies. The last three years have seen an influx of incoming exchange students, especially from French universities with which LiepU has established active partnerships.

More detailed statistics on the mobility of instructors and students are included in attached files **Statistical data on the incoming and outgoing mobility of students.pdf** and **Statistical data on the incoming and outgoing mobility of the teaching staff.pdf**

The following activities for attracting international students have been completed by LiepU Department of International Relations in cooperation with Faculty of Science and Engineering:

1. Visiting education fairs and exhibitions abroad (both online and in person), and meeting students and their parents there.
2. Visiting Erasmus partner Higher Education Institutions abroad: more than 150 international mobility trips of LiepU academic staff members and employees are realized every year, especially highlighting Higher Education Institutions of Erasmus partner countries having established cooperation with LiepU - Mexico, Philippines, Dominican Republic, South Africa, etc. During visits in partner institution, LiepU staff members presents Liepāja University to

potential students as suitable destination for their Erasmus+ exchange studies.

3. High-intensity work with educational agents in foreign countries. This activity brings the most of LiepU incoming international students.
4. Online marketing – information about the LiepU study programs in English is placed for a fee on various search portals where potential students search for study programs, for example, <https://www.bachelorsportal.com/> un <https://www.mastersportal.com/>
4. Informative campaigns on social networks (Facebook, Intstagram, Twitter, Tumblr) and LiepU website in English.
5. Potential students, especially master's level students, are approached through the Latvian state scholarship program.

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

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

During the previous accreditation (November 19th, 2013), experts recommended the following for the improvement of the study programme in Information Technologies (code 42481):

- specify the achievable study results;
- improve the English language skills of teaching staff;
- attract academic staff able to replace senior academics;
- increase number of doctors of science;
- increase number of university teachers having university background in Computer Science;
- increase the international experience of academic staff members;
- increase research activities of academic staff members;
- increase the involvement of students and employers in decisions related to the development of the study programme.

To improve the study program of Mechatronics (code - 42523), experts recommended:

- providing better mechanics training to students;
- improving the curriculum of the study programme;
- hiring new academic staff to pick up the workload of the instructors teaching specialised courses;
- providing the equipment infrastructure for the teaching of courses in the field of mechanics;
- promoting research in the topics of the studies, and the mobility of academic staff;
- involving students in decision-making processes pertaining to the development and focuses of the study programme;
- encouraging the admission of new students, so that the number of students per course is at least sufficient to make the programme cost-effective.

The implementation of the expert recommendations has had a positive effect on the quality of studies in the field of study Technology, Computer Engineering, Electronics, Telecommunications,

Computer Management, and Computer Science. New instructors have been hired to diversify the study process and update the content of some courses. Improving English language skills has led to better cooperation with foreign partners, and to a higher quality of studies for foreign students. The international experience gained by the academic staff has enabled the diversification and updating of the study process. The active involvement of employers in decisions related to the development of the study programme has made it possible to better adapt the content of the studies to the requirements of the job market. A summary of the implementation of the expert recommendations is enclosed in the attached file **P3\_Rekomendacijas\_ENG.pdf**.

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

The study programs of the current study direction were evaluated several times during the previous accreditation period:

- professional Bachelor study program "Information technology" (code 42481) - in 2013 and 2014;
- academic Bachelor study program "Computer Science" (code 43481) - in 2014;
- professional Bachelor study program "Mechatronics" (code 523) - in 2013 and 2014;
- professional Master study program "Information technology" (code 47481) - in 2014 and 2016;
- doctoral study program "E-study technologies and management" (code 51481) - in 2014.

Experts recommendations in all evaluations have been similar and common to all study programs of the field of study. They are indicated in chapter 2.6.1 of the current report.

The expert recommendations were used to shape the field of study and the FSE development plan for 2014–2022. Some of these recommendations have not lost their relevance, and identify the actions to be taken to improve the teaching of the study programmes in the next reporting period. The issue of the number of academic staff members is still relevant. In the previous reporting period, several IT master graduates (V. Priedols, A. Lagzdiņa, M. Freimane, U. Žaimis, M. Gulbis, M. Sinka, and others) were recruited, with a focus to prepare them for taking over several study courses from experienced colleagues. With the support of the CDM project, several LiepU PhD students (V. Priedols, K. Macakare, L. Alksne) were involved in the teaching of courses. Steps were also taken to attract experienced colleagues to the field of study. In the previous reporting period, Dr.math. Dace Kūma chose LiepU as her main job; with the support of the CDM project, a long-term contract for teaching courses was concluded with Dr Radka Nachev. In cooperation with IT companies, IT professionals were recruited to teach some courses. Cooperation with the Liepaja Technology Cluster has made a significant contribution to the identification of highly skilled professionals in Liepaja.

Improving English language skills is largely encouraged as an individual self-learning process, which is regularly discussed in staff meetings. Language courses organised as part of several CDM projects have contributed to significant improvements in this area (A. Jansone, U. Žaimis, Dz. Tomsons, I. Znotiņa, D. Barute, etc.) English language skills have the most direct impact on the study process in the context of international students. However, it has also had a positive impact on

the cooperation of academic staff with foreign partners, its intensification, and the implementation of the results of this cooperation in study programmes.

In line with expert recommendations for the Mechatronics study programme, the curriculum was redesigned to include courses in the field of mechanics, and the equipment in the physics and mechatronics laboratories was upgraded using the available funding. Academic staff growth and the involvement of students in decision-making are addressed in the context of the improvement of other study programmes. The work on the recommendations for improving the Mechatronics study programme has laid the foundations for the development of new courses in other study programmes (e.g. Basic Electronics, Internet of Things, etc.) and for a new study programme in Smart Technologies and Mechatronics.

In the section "Other appendices" , expert evaluations have been added - from 2013 (in file [NovertesanasKomisijasKopejaisAtzinums\\_1911\\_2013.pdf](#)) and from 2016 (in file [Rekomendacijas\\_Mit\\_2016.pdf](#))

# Annexes

I - Information on the Higher Education Institution/ College		
Information on the implementation of the study field in the branches of the higher education institution/ college (if applicable)		
List of the governing regulatory enactments and regulations of the higher education institution/ college	List of the governing regulatory enactments and regulations of the higher education institution.pdf	Liepājas Universitātes galvenie iekšējie normatīvie akti un regulējumi.pdf
The management structure of the higher education institution/ college	Strukturshema_ENG.pdf	Strukturshema_LV.pdf
II - Description of the Study Field - 2.1. Management of the Study Field		
Plan for the development of the study field (if applicable)	AttistibasPlansEN.pdf	AttistibasPlans.pdf
The management structure of the study field	Management structure of the study direction_ENG.pdf	Studiju virziena parvaldības shema_LV.pdf
A document certifying that the higher education institution or college will provide students with opportunities to continue their education in another study programme or another higher education institution/ college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.	Cooperations agreement.pdf	SadarbībasLīgumi.pdf
A document certifying that the higher education institution or college guarantees compensation for losses to students if the study programme is not accredited or the study programme license is revoked due to actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.	04.07.2022_1.-1.6._246.edoc	04.07.2022_1.-1.6._245.edoc
Standard sample of study agreement	STUDY_AGREEMENT_sample_ENG.pdf	Studiju līguma paraugi_stud_virz_IT_LV.pdf
II - Description of the Study Field - 2.2. Efficiency of the Internal Quality Assurance System		
Analysis of the results of surveys of students, graduates and employers	P22_Survey_Students_Graduates.pdf	P22_Studentu_AbsolventuAptauja.pdf
II - Description of the Study Field - 2.3. Resources and Provision of the Study Field		
Basic information on the teaching staff involved in the implementation of the study field	ITvirziena_macibspeki_EN.xlsx	ITvirziena_macibspeki_LV.xlsx
Biographies of the teaching staff members (Curriculum Vitae in Europass format)	CV_ITvirziena_macibspeki_EN.pdf	CV_ITvirziena_macibspeki_LV.pdf
A statement signed by the rector, director, head of the study programme or field that the knowledge of the state language of the teaching staff involved in the implementation of the study programmes within the study field complies with the regulations on the state language knowledge and state language proficiency test for professional and official duties.	ValstsValoda_EN_05.07.2022_7.D-7.10._55.edoc	ValstsValoda_LV_05.07.2022_7.D-7.10._58.edoc
A statement of the higher education institution/ college on the respective foreign language skills of the teaching staff involved in the implementation of the study programme at least at B2 level according to the European Language Proficiency Assessment levels (level distribution is available on the website www.europass.lv, if the study programme or part thereof is implemented)	AngluValoda_EN_05.07.2022_7.D-7.10._57.edoc	AngluValoda_LV_05.07.2022_7.D-7.10._56.edoc
II - Description of the Study Field - 2.4. Scientific Research and Artistic Creation		
Summary of quantitative data on scientific and/ or applied research and/ or artistic creation activities corresponding to the study field in the reporting period.	P24_QuantitativeDataOnResearch.pdf	P24_ZinatnesKvantitativoDatuApkopojums.pdf
List of the publications, patents, and artistic creations of the teaching staff over the reporting period.	MacibspekuPublikācijas_EN.pdf	MacibspekuPublikācijas.pdf
II - Description of the Study Field - 2.5. Cooperation and Internationalisation		
List of cooperation agreements, including the agreements for providing internship	P2_Sadarbības_līgumu_saraksts_IT_2022_EN.pdf	P2_Sadarbības_līgumu_saraksts_IT_2022.pdf
Statistical data on the teaching staff and the students from abroad	Statistical data on the teaching staff and the students from abroad.pdf	ArvalstuStudentiDocetaji.pdf
Statistical data on the incoming and outgoing mobility of students (by specifying the study programmes)	Statistical data on the incoming and outgoing mobility of students.pdf	Erasmus.pdf
Statistical data on the incoming and outgoing mobility of the teaching staff	Statistical data on the incoming and outgoing mobility of the teaching staff.pdf	Erasmus_Docetaji.pdf
II - Description of the Study Field - 2.6. Implementation of the Recommendations Received During the Previous Assessment Procedures		
Report on the implementation of the recommendations received both in the previous accreditation and in the licensing and/ or change assessment procedures and/ or the procedures for the inclusion of the study programme on the accreditation form of the study field.	P3_Rekomendācijas_ENG.pdf	P3_Rekomendācijas.pdf
An application for the evaluation of the study field signed with a secure electronic signature	08.07.2022_1.-1.6._256.edoc	08.07.2022_1.-1.6._255.edoc
III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme		
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	APPENDIX_5_Statistical data on students in the study programme.docx	
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard		
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		4_pielikums.docx
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme		
The curriculum of the study programme (for each type and form of the implementation of the study programme)	ITbakalauri_TipveidaPlans_EN.pdf	Datorzinātnes_TipveidaPlans_LV.pdf
Descriptions of the study courses/ modules		P10_Mit_KursuApraksts.pdf
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		

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

## Other annexes

Name of document	Document
VentspilsAugstskolas_apliecinajums.pdf	VentspilsAugstskolas_apliecinajums.pdf
KVS procedūra_S-6-I Studiju progarmmu izstrade un licencesana	S-6-I_studiju programmu izstrade un licencesana_LV.pdf
QMS procedure_S-6-I_ENG Development and licensing of study programmes	S-6-I_ENG_Development and licensing of study programmes.pdf
Studiju turpināšanas iespējas angļu valodā LLU	Par_stud_programmu_istenosanu_anglu_val_cita_augstskola.pdf
Studiju turpināšanas iespējas angļu valodā ViA	Par_stud_pr_VieTuM_istenosanu_anglu_val_cita_augstskola.pdf
Programmas VTM nosaukuma nesakritības pamatojums	Par_VieTuM_nosaukumu_nesakritibu_sadarbibas_ligumos.pdf
Possibilities of continuing studies in English LLU	Program implementation EN_LULST.edoc
Possibilities of continuing studies in English in ViA	Program implementation EN_VA.edoc
Inconsistency between the titles of the study program VTM	Title inconsistency.edoc
IT virziena akreditācijas lapa 2022	Akreditac_IT_virz_Nr.2022-11_23_03_2022.pdf
VTM licence	Licence_VieTuM_Nr.2021-02K_14.07.2021.pdf
Lēmums par VTM licenci	Lemums_licencei_VieT_Nr.2021-06-L_17.03.2021.pdf
Novērtēšanas komisijas kopejais atzinums 2013.gada 19.novembrī	NovertesanasKomisijasKopejaisAtzinums_1911_2013.pdf
Studiju akreditācijas komisijas lēmums 2013.gada 18.decembrī	StudijuAkreditācijasKomisijasLemums_1812_2013.pdf
Studiju virziena akreditācijas lapa 2016.gada 18.augustā	StudijuVirzienaAkreditācijasLapa_1808_2016.pdf
Ekspertu atzinums par izmaiņām maģistra studiju programmā "Informācijas tehnoloģija" (47481) 13.07.2016.	Rekomendācijas_Mit_2016.pdf
Methodological guidance_ENG.pdf	Methodological guidance_ENG.pdf
Moodle lietotāja rokasgrāmata_LatvianOnly.pdf	Moodle lietotāja rokasgrāmata_LatvianOnly.pdf
Regulation on final_state and state final examinations_ENG.pdf	Regulation on final_state and state final examinations_ENG.pdf
Regulations for Course_Module Examinations_ENG.pdf	Regulations for Course_Module Examinations_ENG.pdf
Development and licensing of study programmes_ENG.pdf	S-6-I_Development and licensing of study programmes_ENG.pdf
Development and approval of study courses_ENG.pdf	S-7-I_Development and approval of study courses_ENG.pdf
Management of changes of study courses_ENG.pdf	S-7-II Management of changes of study courses_ENG.pdf
Submission and Handling of Student Proposals and Complaints_ENG.pdf	VS-3-I_Submission and Handling of Student Proposals and Complaints_ENG.pdf
Regulation on Election of Professors and Associate Professors.doc	Regulation on Election of Professors and Associate Professors.doc
Regulation on Election to Academic Positions.doc	Regulation on Election to Academic Positions.doc

# Information Technology (47482)

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
ProcedureStudyProgram.Name	<i>Information Technology</i>
Education classification code	<i>47482</i>
Type of the study programme	<i>Professional master study programme</i>
Name of the study programme director	<i>Anita</i>
Surname of the study programme director	<i>Jansone</i>
E-mail of the study programme director	<i>anita.jansone@liepu.lv</i>
Title of the study programme director	<i>Dr.sc.comp.</i>
Phone of the study programme director	<i>26493697</i>
Goal of the study programme	<i>The aim of the professional Master's study programme "Information technology" is to educate high qualification specialists for professional activity in the field of information and communication technology with specialization in software engineering or management of information technology projects.</i>
Tasks of the study programme	<p><i>Main tasks for achieving the aim:</i></p> <ul style="list-style-type: none"> <li><i>• to create opportunities for students to acquire second level professional higher education in the field of information and communication technology (ICT);</i></li> <li><i>• to develop ability to understand, evaluate and use global tendency in context of state's regional development, and to ensure the development of acquired knowledge, skills, abilities and professional treatment according to requirements of labour market;</i></li> <li><i>• to promote satisfaction of need for self-education and participation in further education;</i></li> <li><i>• to develop proficiency in research work and creative approach to software engineering or solutions of management problems;</i></li> <li><i>• to provide connection between academic and businesslike researches and study work and solve professional problems, involving students in researches about current problems in information technologies;</i></li> <li><i>• to promote proper understanding of professional ethics standarts and to observe it at work and social life;</i></li> <li><i>• to prepare professional masters in information technologies, who could successfully continue their studies in doctoral programmes in any of ITT science fields or interdisciplinary study programmes.</i></li> </ul>

Results of the study programme	<p>1.The general skills have been acquired which are necessary to be able manage teamwork, plan the work, present the IT solutions and the results of the work done in Latvian and English.</p> <p>2.The common knowledge of the information technology industry on the design of computer systems and the basic principles for building them, IT applications for natural, technical, and social process solutions, national and international standards of the IT industry and IT industry terms in Latvian and English, as well as advanced skills for the use of acquired knowledge in practice, has been acquired.</p> <p>3.Methods and technologies for programming, development and maintenance of computer systems have been learned.</p> <p>4.The skills needed to carry out independent research in the information technology sector have been acquired and developed.</p> <p>5.Special skills have been acquired and developed in the profession of programming engineer required to perform professional duties - coding, design, software maintenance, software deployment, software testing, specification of requirements, preparation of user documentation and software project planning.</p> <p>6.Special skills have been acquired and developed in the profession of information technology project manager.</p>
Final examination upon the completion of the study programme	Master's Thesis

## Study programme forms

### Full time studies - 2 years - latvian

Study type and form	Full time studies
Duration in full years	2
Duration in month	0
Language	latvian
Amount (CP)	80
Admission requirements (in English)	professional bachelor's degree in computer science or second-level higher professional education, if at least 60 CRP courses have been acquired in the field of computer science and information technology in the study program and / or in a listener status and a minimum level of B2 in English
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Professional master's degree in information technology
Qualification to be obtained (in english)	---

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### 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)	82
Admission requirements (in English)	<i>professional bachelor's degree in Computer Science or Information Technology or second-level higher professional education, if at least 60 credit-points have been earned in the courses of Computer Science and Information Technology in the study programme and / or in a listener status and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional master's degree in information technology</i>
Qualification to be obtained (in english)	---

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### Full time studies - 2 years - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	2
Duration in month	0
Language	<i>latvian</i>
Amount (CP)	80
Admission requirements (in English)	<i>academic or professional bachelor's degree in computer science or information technology, or academic bachelor's or second-level higher professional education, if at least 60 CRP courses have been acquired in the field of computer science and information technology in the study program and / or in a listener status</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional master's degree in information technology</i>
Qualification to be obtained (in english)	<i>Lead software engineer or information technology project manager</i>

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### Full time studies - 3 years - latvian

Study type and form	<i>Full time studies</i>
Duration in full years	3
Duration in month	0
Language	<i>latvian</i>
Amount (CP)	120

Admission requirements (in English)	<i>an academic or professional bachelor's degree in mathematics or physics; or academic bachelor's degree or 2nd level higher professional education, provided that the programme of study and/or the listener has completed courses in the field of computer science and information technology amounting to at least 20 CP and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional master's degree in information technology</i>
Qualification to be obtained (in english)	<i>Lead software engineer or information technology project manager</i>

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### Full time studies - 2 years - english

Study type and form	<i>Full time studies</i>
Duration in full years	<i>2</i>
Duration in month	<i>0</i>
Language	<i>english</i>
Amount (CP)	<i>82</i>
Admission requirements (in English)	<i>academic or professional bachelor's degree in Computer Science or Information Technology or professional bachelor's degree or second-level higher professional education, if at least 60 credit-points have been earned in the courses of Computer Science and Information Technology in the study programme and / or in a listener status and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional master's degree in information technology</i>
Qualification to be obtained (in english)	<i>Lead software engineer or information technology project manager</i>

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### 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>122</i>

Admission requirements (in English)	<i>academic or professional bachelor's degree in Mathematics or Physics or academic bachelor's degree or second-level higher professional education, if at least 20 credit-points have been earned in the courses of Computer Science and Information Technology in the study programme and / or in a listener status and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional master's degree in information technology</i>
Qualification to be obtained (in english)	<i>Lead software engineer or information technology project manager</i>

### **Places of implementation**

<b>Place name</b>	<b>City</b>	<b>Address</b>
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 3.1. Indicators Describing the Study Programme

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

The professional study programme "Information Technology" underwent significant changes in the reporting period in 2016, with changes in study durations. A description of the changes is given in the Annex. From 2013 to 2016, the programme was implemented with two study durations: 2 years and 6 months and 3 years. The last students with these study durations graduated in 2018. Starting from the academic year 2016/2017, students started their studies in the programme with the following study durations: 1 year and 6 months (national language/English), 2 years (national language/English) and 3 years (national language/English).

Due to the COVID19 epidemic and distance learning, the semesters for the implementation of study courses were changed, as well as courses were divided into several semesters or academic years, for example - Master's thesis development (20 CP) was divided into 6 CP and 14 CP, which ensured the continuation of studies in a distance mode.

In preparation for the re-accreditation of the study programmes, the implementation of the study programmes, student and alumni surveys, as well as employer recommendations have been analysed and the following changes have been made: The programme will not be offered for 1 year and 6 months as no students have studied in this stream. The programme is offered with 2 and 3 year study durations. In recent years, there has been interest in the 3 year programme, due to the popularity of IT and the interest in retraining in IT.

The study programme is structured on a modular basis, with each module consisting of 10 Cps and is taught in a compact manner. This approach will allow flexibility in offering optional modules and efficient planning of programme delivery costs by organising summer and winter admission streams.

In addition to the existing Cloud Computing module, the programme also includes up-to-date modules on Artificial Intelligence, Smart Technologies and Sensor-Based Systems. The programme includes an ERASMUS module (20 CPs) to enable students to make more effective use of ERASMUS mobility opportunities.

In connection with the Cabinet of Ministers Regulation No. 322 (Riga, 13 June 2017 (Prot. No. 30, 18. §)) on the Latvian classification of education, the programme code must be changed. LR education classification code (ECC): **47482**

It is necessary to change the qualification from Software Engineer to Lead Software Engineer, which corresponds to the seventh (7th) Latvian Qualifications Framework level (LQF level 7)).

### 3.1.2. Analysis and assessment of the study programme compliance with the study field. Analysis of the interrelation between the code of the study programme, the degree,

**professional qualification/professional qualification requirements or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements. Description of the duration and scope of the implementation of the study programme (including different options of the study programme implementation) and evaluation of its usefulness.**

The aim of the Master's study programme "Information Technology" is to prepare highly qualified specialists for professional activities in the field of information technology and telecommunications with specialisation in software engineering or information technology project management.

**Title of the study programme: Information Technology**

LR education classification code (ECC): 47482

Study programme type: Professional masters study programme

Study mode: full-time on-campus

Degree awarded: Professional Master's degree in Information Technology

Duration of the study programme:

2 years (without qualification)

2 years (with qualification)

3 years (with qualification)

Qualification:

- Lead Software Engineer or
- IT project manager

Scope of the programme: 80/82\* or 120/122\* credit points

\* - Study language English

**Admission requirements:** are harmonised with the requirements corresponding to the industry and the admission regulations of Liepaja University (please refer to the electronic link in Annex 1.2.A "The main internal normative regulations of Liepaja University"):

**Full-time - 2 years** (without qualification)

- a professional bachelor's degree in computer science or information technology, or
- 2nd level higher professional education, provided that the programme of study and/or the courses taken as a student have covered at least 60 CP in the field of computer science and information technology
- and a minimum level of B2 in English

**Full-time - 2 years** (with qualification)

- an academic or professional bachelor's degree in computer science or information technology; or
- academic bachelor's degree or 2nd level higher professional education, provided that the programme of study and/or the listener has completed courses in the field of computer science and information technology amounting to at least 60 CP

- and a minimum level of B2 in English

**Full-time - 3 years** (with qualification)

- an academic or professional bachelor's degree in mathematics or physics; or
- academic bachelor's degree or 2nd level higher professional education, provided that the programme of study and/or the listener has completed courses in the field of computer science and information technology amounting to at least 20 CP
- and a minimum level of B2 in English

**Entrance exams:**

- paper (on a freely chosen and topical research problem in the field of ICT, 5-10 pages)
- discussion on the relevance of the research problem in the field of ICT and personal experience in the field

**Advantages:**

- persons who have obtained a bachelor's degree in computer science or information technology within the last two years may apply by choosing to submit a paper or an assessment of their bachelor's thesis

The scope of the study programme is 80/82\* or 120/122\* credit points; study duration - 3 or 2 years, in accordance with the Cabinet of Ministers' "Regulations on the State Standard of Second Level Professional Higher Education" (No. 512; from 26.08.2014)

The study programme (for study duration of 2 years) in Latvian is 80 credits, while in English is 82 credits to ensure the acquisition of the national language (Course "Latvian Language for Foreign Students" 2 CP), as required by the professional standard.

The study programme (for study duration of 3 years) in Latvian is 120 credits, while in English is 122 credits to ensure the acquisition of the national language (Course "Latvian Language for Foreign Students" 2 CP), as required by the professional standard.

The content of the general education courses (except for the course "Latvian Language for Foreign Students" 2 CP) and the content of the field study courses is the same in both languages.

After completing the study programme, students obtain a professional master's degree in information technology and a qualification - leading software engineer or information technology project manager, which is the fifth level of professional qualification (PQL 5) and corresponds to the seventh level of the Latvian Qualifications Framework (LQF 7).

Study programme code - 47482

- Education level: Higher education (4 - first digit)
- Type of education programme: 2nd level higher professional education (5th level professional qualification and professional master's degree); LQF - level 7 (47 - first and second digits);
- Education subject group: science, maths and information technology (4 - third digit)
- Subject area of education: computing (48 - third and fourth digits);
- Group of educational programmes: computer skills (482 - third, fourth and fifth digits)

The title, code, Master's degree and professional qualifications of the study programme "Information Technology" correspond to the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science". (See the electronic link in Annex 1.2.A. Main internal normative acts and regulations of the University of Liepāja. Development Strategy of the University of Liepāja 2016-2020 TERM EXTENDED UNTIL 2023)

The content of the study programme "Information Technology" is designed to be relevant for the professional Master's degree in Information Technology and the qualification "Leading Software Engineer" or "Information Technology Project Manager". (See Annex 7, "Compliance of the Professional Master's Study Programme "Information Technology" with the Professional Standard")

The admission requirements for the 2-year (non-qualifying) programme include the requirement of a professional Bachelor's degree, as graduates of the programme obtain a professional Master's degree. Applicants who do not hold a professional Bachelor's degree in Computer Science or Information Technology must have 2nd level higher professional education and have attended courses in the field of Computer Science and Information Technology of at least 60 CP as a student and/or listener in order to be able to master the content of the study programme.

For the 2-year course (qualifying), the admission requirements include a Bachelor's degree. Applicants who do not hold a Bachelor's degree in Computer Science or Information Technology must have completed a minimum of 60 CP in courses in the field of Computer Science and Information Technology as a student and/or as a listener in order to be able to master the content of the programme.

For the 3-year course (qualifying), the admission requirements include a Bachelor's degree. Applicants who do not hold a Bachelor's degree in Computer Science or Information Technology must have completed a minimum of 20 CP in courses in the field of Computer Science and Information Technology as a student and/or as a listener in order to be able to master the content of the programme. Upon completion of the first year of study, students will have acquired the necessary knowledge in software engineering, which totals 60 CP (20 CP+40 CP), and will be able to master the content of the study programme and obtain a Master's degree and the chosen qualification.

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

The study programmes correspond to the STEM field (*Science, Technology, Engineering, and Mathematics*) and their development is prospective in terms of national development priorities[1] and is related to the implementation of the Strategy for smart specialisation[2]. The EM labour market analysis also shows that even with relatively high wages, it is already difficult to meet the growing demand for IT specialists - programmers. As a result, there is insufficient supply and high demand for IT specialists. This is because business models, methods and tools have changed significantly in recent years. The development of any industry requires large-scale IT services due to implementing a variety of digital solutions. This trend is also confirmed by the 2016 EM report "Labour Market Realignment for a Faster Growing Economy"[3], which predicts that the demand for science, mathematics and information technology specialists will increase in the future. Demand in this group is forecast to exceed supply by 126%.

Despite the relatively high supply of study programmes in Latvia, there is a shortage of at least 1000 IT specialists[4]; according to the Ministry of Economics, by 2020 there will be a shortage of more than 4200 IT specialists in Latvia. Unfortunately, according to the Tele2 SSC survey, only 12.7% of boys and 2.1% of girls pursue a career in IT[5].

The study programme is in line with Priority 3 of the Latvian strategy for smart specialisation "Increasing energy efficiency", Priority 4 "Development of a modern ICT system in the private and

public sectors", Priority 6 "Developed knowledge base (basic science and scientific infrastructure) and human capital in knowledge areas". The Smart specialisation areas "Smart materials, technologies and engineering systems", "Smart energy" and "Information and communication technologies" correspond to these priorities. IT programmes train professionals to develop new products for modern and efficient public administration, e-services and digital content development, cross-border cooperation for the digital single market.

The development and activities of the programme are coordinated with the Kurzeme region sustainable development planning documents, as well as with the "Liepaja City Sustainable Development Strategy until 2030", which indicates Liepaja as an education, science and research centre, and emphasises the development of natural and engineering sciences in Liepaja.

The Ministry of Economy's "Informative Report on Medium- and Long-term Labour Market Projections"[6] notes that education policy has set a target to restructure state support for higher education studies in line with medium-term labour market projections. In 2020, the share of budget places in science and engineering (Natural Sciences, Mathematics and Information Technology thematic group and Engineering, Manufacturing and Construction thematic group) is expected to reach more than half or 55% of the total number of budget places (p.43). As well as proposals to improve labour market supply in higher education, it is pointed out (p.97) that the number of budget study places in engineering, information and communication technologies, pharmacy and agriculture should be further increased; the provision of universities with modern facilities, equipment and technologies in priority fields of study such as natural sciences, mathematics and information technologies, engineering, manufacturing and construction should be improved.

The study programme is designed to respond to the dynamic changes in the economic situation and the labour market regarding the need for ICT and engineering professionals. The results of labour market studies carried out in Latvia in recent years (Informative report of the Ministry of Economics on medium- and long-term labour market forecasts[7]) show the need and growing demand for ICT specialists. According to the Ministry of Economics' "Information Report on Medium and Long-term Labour Market Projections", even with relatively high wages, there are already difficulties in meeting the growing demand for IT specialists - programmers. As a result, there is insufficient supply and high demand for IT specialists. This is due to the fact that the business model has changed significantly in recent years. Any industry requires large-scale services from other industries, such as IT services.

The Latvian Information and Communication Technology Association (LIKTA) also states in its letter of support that "there is currently a catastrophic shortage of specialists in the information and communication technology sector. In addition, the training of skilled ICT professionals is a pressing problem not only in Latvia, but across Europe and, according to EU forecasts, by 2020 there will be a shortage of more than 900 000 ICT professionals in Europe in various sectors. "According to the Digital Agenda Scoreboard, 40% of companies in the EU are currently struggling to fill ICT vacancies. In Latvia, the number of ICT companies is growing every year, which shows that the need for new professionals will increase." IT degree programmes should therefore be supported and developed to train new professionals.

Employers' views on the study programme are reflected in the internship reports and indicate that all students are good at organising their work, are in good contact with company management and their colleagues, and have sufficient theoretical and practical knowledge. During traineeships, students learn new things, demonstrating their growth both in terms of knowledge and practical work. All students received only the grades "good", "very good", "excellent" or "outstanding" for their internship.

Representatives of IT companies Emergn Latvia, Accenture Latvia, SIA "Microsoft Latvia",

Giraffe360, TestDevLab, Like A Coffee, DEVS.LV are organising guest lectures on topical computing topics. Liepaja University is a member of Latvian Information and Communication Technology Association (LIKTA), Electrical Engineering and Electronics Industry Association (LETERA), IT Cluster and Microsoft IT Academy Program.

Most graduates work in IT companies as IT specialists, e.g. software development quality assurance engineer, technical consultant, web developer, information systems tester, systems analyst, IT project manager, etc. Graduates have jobs in Liepāja, for example, Emergn Latvija, Tieto Latvia, Giraffe360, TestDevLab, also in companies founded by LiepU IT graduates "IT Līderis", PROGoteam, HighFive.lv, etc., and elsewhere in Latvia and abroad, for example, Accenture, MikroTik, "Like A Coffee", etc. Some IT Master's graduates are also LiepU faculty members (Mārtiņš Sinka, Aija Lagzdīņa, Māris Gulbis). Graduates indicate in the survey that the knowledge and competences acquired during their studies are relevant to their professional responsibilities.

Graduates have a wide range of employment opportunities in Latvia and abroad. For example, looking at one of the job portals CV.lv (viewed: 15/09/2022, at 11:20), the highest number of vacancies is offered in the section "Information Technology" (835). There are vacancies in both programming and project management.



There are also plenty of opportunities for graduate employment abroad. For example, looking at the websites of international IT companies (<https://www.accenture.com/>, <https://www.tietoevry.com/>, <https://www.emergn.com/>), they all have job offers outside Latvia.

[1]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_darba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_darba_tirgus_videja_un_ilgtermina_prognozem)

[2] [http://viaa.gov.lv/lat/zinatnes\\_inovacijas\\_progr/viedas\\_sPECIALIZACIJAS\\_iev/viedas\\_spec\\_ieviesana/](http://viaa.gov.lv/lat/zinatnes_inovacijas_progr/viedas_sPECIALIZACIJAS_iev/viedas_spec_ieviesana/)

[3]

[https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j\\_salmins\\_\\_darba\\_tirgus\\_parkartojumi\\_ekonomikas\\_izaugsmei20160519.pdf](https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j_salmins__darba_tirgus_parkartojumi_ekonomikas_izaugsmei20160519.pdf)

[4]<http://nra.lv/latvija/izglitiba-karjera/153292-ikt-nozare-attistas-specialistu-trukums-arvien-izteiktaks.htm>; date of access:20.10.2015.

[5][http://www.tvnet.lv/tehnologijas/nozares\\_jaunumi/628033-tikai\\_21\\_meitenu\\_un\\_127\\_zenu\\_plano\\_savu\\_karjeru\\_saistit\\_ar\\_it\\_nozari](http://www.tvnet.lv/tehnologijas/nozares_jaunumi/628033-tikai_21_meitenu_un_127_zenu_plano_savu_karjeru_saistit_ar_it_nozari); 01.10.2016.

[6]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_darba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_darba_tirgus_videja_un_ilgtermina_prognozem),

[7]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_darba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem/](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_darba_tirgus_videja_un_ilgtermina_prognozem/)

Most graduates work in IT companies as IT specialists, e.g. software development quality assurance

engineer, technical consultant, web developer, information systems tester, systems analyst, IT project manager, etc. Graduates have jobs in Liepāja, for example, Emergn Latvija, Tieto Latvia, Giraffe360, TestDevLab, also in companies founded by LiepU IT graduates "IT Līderis", PROGoteam, HighFive.lv, etc., and elsewhere in Latvia and abroad, for example, Accenture, MikroTik, "Like A Coffee", etc. Some IT Master's graduates are also LiepU faculty members (Mārtiņš Sinka, Aija Lagzdiņa, Māris Gulbis). Graduates indicate in the survey that the knowledge and competences acquired during their studies are relevant to their professional responsibilities.

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

The professional study programme "Information Technology" underwent significant changes in the reporting period in 2016, with changes in study durations. From 2013 to 2016, the programme was implemented with two study durations: 2 years and 6 months and 3 years. The last students with these study durations graduated in 2018. Starting from the academic year 2016/2017, students started their studies in the programme with the following study durations: 1 year and 6 months (national language/English), 2 years (national language/English) and 3 years (national language/English).

Admission of foreign students (study programme in English) takes place 2 times per academic year - summer and winter admission.

Admission in Latvian is held once per academic year - summer admission.

133 students studied during the reporting period. On average, 30 students studied per academic year during the reporting period. The highest number of students was in the 2016/2017 academic year (42), which was related to changes in the study programme. The lowest was in the 2020/2021 academic year (22), due to the demographic situation in the country and the workload of IT professionals in companies and the fact that a Master's degree is not a requirement to work in IT companies.

The average number of foreign students per academic year was 10. The highest number of students was in 2018/2019 and 2021/2022 academic years (15). The lowest was in the 2015/2016 academic year (1), which is due to the study programme not being recognised in the education market.

The average number of students withdrawn is 4 per academic year (1 by their own choice, 3 due to poor results). Mainly foreign students dropped out due to poor results.

During the reporting period, 61 students graduated from the study programme. The average number of graduates per academic year is 7. The highest number of graduates was in the 2017/2018 academic year (19), the lowest - in the 2015/2016 academic year (3). The 1 graduate from the 2021/2022 academic year shown in the table is a winter admission graduate.

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

## **3.2. The Content of Studies and Implementation Thereof**

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

The development of the study programme is influenced by trends in the development and digitisation of global society. ICT products are playing an increasingly important role in the economy, in global, national and regional affairs, in education, in society and in the daily lives of individuals. Long-term forecasts point to a growing demand for professionals who can create, maintain and use digital products and services. According to the Latvian Information and Communication Technology Association (LIKTA) (likta.lv), the ICT sector is one of the most export-oriented sectors of the economy, for example, in 2021 53% of the ICT sector's turnover was export. According to the information gathered by the Liepāja Digital Innovation Park, at the beginning of 2022 there were 84 ICT companies operating in Liepāja. Some of them, together with Liepāja University and organisations (foundations and associations) interested in ICT and industry development, established the Liepāja Technology Cluster in 2020, which aims to promote IT skills at all levels, among different groups of society, attract highly qualified specialists, raise public awareness about technology and develop the Liepāja IT ecosystem. Representatives of ICT companies working in Liepāja have also pointed out at various meetings and seminars that software projects have been rejected due to lack of IT specialists.

In the development of the study programme content, determination of the aim, objectives, planned study results and study approaches the ACM guidelines "CC2020 - Computing Curriculum 2020" , "Software Engineering 2014 Curriculum Guidelines for Undergraduate Degree Programmes in Software Engineering (SE2014)" and project management guidelines "A Guide to the Project Management Body of Knowledge And The Standard for Project Management" (Seventh Edition, ANSI/PMI 990012021) were taken into account. As well as the experience of various universities around the world and in Latvia in organising and implementing undergraduate studies in the field of information technology. Several proposals and ideas for the content of the study programme and approaches to its implementation have been gathered and analysed over the years in meetings with representatives of IT companies - both in discussions after the defence of bachelor and master theses in the study programme "Information Technology" and in specially organised seminars.

The achievability of the planned study outcomes and their relation to the study courses planned in the study programme can be seen in the study course mapping table (Annex 8).

The achievement of the aims, objectives and defined study results of the study programme "Information Technology" is ensured by the content of the study programme. The content of the study programme is implemented in compulsory, compulsory elective and free elective study modules, internships and the development and defence of a master's thesis. The compliance of the study courses with the national standard for the second level of professional higher education can be found in Annex 6, their compliance with the standard for the profession "Lead software engineer" and with the standard for the profession "Information technology project manager" - in Annex 7.

Most of the courses are divided into 10 credit point (or 15 ECTS) modules, each of which culminates in a modular project or final project in one of the courses. Each module consists of several study courses. 1-2 modules are implemented each semester, except the final semester.

The study programme has 2 durations - 2 years and 3 years. The duration of the studies depends on the student's previous education.

Study programme by semesters can be seen in the document "Study process by semesters", attached in the Annex.

The 3-year duration is for students with a degree in a field other than IT or computer science and who have completed at least 20 CP of courses in computer science and information technology. In the first year (40 CP), students learn the basics of software engineering. The content of the modules "Software Engineering I", "Software Engineering II" and "Software Project Planning and Implementation" is designed to cover the full software lifecycle. The study module "Computer Systems and Computer Networks" provides knowledge and skills that graduates can later use as IT consultants, IT department managers or computer systems administrators in companies. The first year of study ends with the documentation of a web-based database system and full software project in accordance with Latvian and international software engineering standards. Students work in teams, usually with 3-4 people in each team. At the end of the first year of study, the student must have completed at least 60 CP in the field of computer science and information technology. Further studies are organised with students of 2 years' duration.

The 2-year study programme is for students with a Bachelor's degree in Information Technology or Computer Science, or if they have taken at least 60 CP of courses in Computer Science and Information Technology as part of their programme of study and/or as a listener. In addition, students with a professional bachelor's degree can choose to study for one of the qualifications, or just a professional master's degree without the qualification. In the first year of study, students take compulsory study modules such as "Project Management" and "Research in Information Technology", including a research internship of 6 CP. They can also study modules related to the qualification - IT Project Management or Software Engineering. Depending on the student's choice (with/without qualification), in the first year the student can choose 1-2 free elective modules. In the second year, depending on the option (with/without qualification), the student goes on a qualification placement (20 CP) or acquires free elective modules (20 CP) or they can go on an ERASMUS+ mobility. The second year of study culminates in the development and defence of a Master's thesis.

Course descriptions are included in Annex 9.

The content of study courses/modules is updated in line with industry, labour market and scientific developments in accordance with the QMS procedure S-7-II Management of changes in study courses (See Annex)

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

Graduates of the Professional Master's programme are awarded a Professional Master's degree in Information Technology. The relevant branch of science, according to the Regulations on Scientific Industries and Subdisciplines of Latvia (No. 49), is Engineering and Technology, sub-discipline Electrical Engineering, Electronics, Information and Communication Technologies. The content of the study programme is based on current technology trends such as Artificial Intelligence and Machine Learning, Internet of Things, Big Data, Smart Technologies, Cloud Computing, etc. (<https://titania.saeima.lv/livs/saeimasnotikumi.nsf/0/F3B2AB6DF0B43B27C2258815003ABAE1?OpenDocument&prevCat=13%7Cizgl%C4%ABt%C4%ABbas,%20kult%C5%ABras%20un%20zin%C4%81tnes%20komisija>).

The study content covers the following areas: Data Processing Systems and Computer Networks, Computer Architecture and Hardware, Elements of Electronics, Telecommunication Networks, Computer Engineering and Networks, Electrical Engineering and Automation, Computer Control, Systems Analysis, Modelling and Design, E-Learning Technologies and Management.

The relevant content of the study programme is taught in modules: Research in Information Technology, Software Engineering, Artificial Intelligence, Cloud Computing, Sensor-based Systems, Smart Technologies, Software Development I, Software Development II, Computer Systems and Networks.

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

Study programme courses take place in form of lectures, seminars, practical classes, tutorials, internships; through students' independent work; e-learning tools are available on Moodle <https://estudijas.liepu.lv/?lang=en>.

The study programme is carried out in modules, with each module having a final project, assignment or set of assignments. Each course in the module contributes a part of the final project. This helps to reduce student workload and gives an insight into how different entities interact with each other, allowing a basic level understanding of how projects are implemented in a corporate environment.

Liepaja University Regulations on course/module examinations (link to the electronic document

here:

[https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course\\_Module%20Examinations.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf)

Ensures objective assessment of students' knowledge and promotes systematic study work during the semester. The assessment of the programme follows generally accepted principles such as:

- The principle of assessment transparency, which is a set of requirements for the assessment of the learning outcome in accordance with the aims and objectives of the study programme and study courses;
- Summative principle for positive achievements, where the learning is assessed by summing positive achievements;
- the mandatory nature, which requires a pass grade for the entire content of the study programme;
- the principle of varied testing, using different types of tests to assess acquisition;
- The principle of reviewability, for which the University has established procedures for reviewing the marks obtained;
- the principle of relevance, which enables the assessment to demonstrate ability, knowledge, skills and competences at all levels of learning, in appropriate tasks and situations.

Examinations and assessments may use different forms of testing, such as oral, written, combined and computer-based. Consultations are available to students before exams.

The main forms of knowledge assessment are tests, quizzes, seminars, discussions, coursework, etc. Students' knowledge is also assessed at the end of their studies, mainly during the examination periods twice a year. To ensure a student-centred approach, the final assessment is predominantly a cumulative assessment, including the student's work throughout the course. This is done on a course-by-course basis, taking into account the specificities of each course.

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

LiepU Faculty of Science and Engineering has signed cooperation agreements with several IT companies in Latvia and Liepaja, which includes a promise to accept students for internships. During the previous accreditation period, cooperation agreements were concluded with the following IT companies: Emergn Latvia (Exigen Services Latvia), Accenture Latvia, TestDevLab, Microsoft Latvia, MikroTikls, Tilde, Lursoft IT, Tieto Latvia, "Like A Coffe", ProgoTEAM, S-Tec Latvia, IT Līderis, Enters, "Fantasyposh Latvia", "Highfive", "Passive Management", "Giraffe360", DEVS.LV, Tet, UPB, AE Partner, InPass, as well as with Kurzeme Business Incubator, Latvian Chamber of Commerce and Industry, Latvian Information and Communication Technology Association (LIKTA), Microsoft IT Academy Program, Liepaja City Council, etc. In the case of each individual student, tripartite internship agreements are concluded between LiepU, the internship company and the

student. The company undertakes to provide the intern with work duties appropriate to the internship programme and/or the occupational standard during the internship. In addition, a suitably qualified consultant is appointed by the company to coordinate and advise students during their internship.

Foreign students have fewer options for internships due to language barriers. But the problem is not critical. Many IT companies work on international software projects where English is the working language, and are therefore willing to take on international students. Tripartite internship agreements are in Latvian, but the student has access to an English translation of the document.

Employers' internship reports indicate that all students are good at organising their work, have good contact with company management and colleagues, and have sufficient theoretical and practical knowledge. All students received only the grades "good", "very good", "excellent" or "outstanding" for their internship.

Students also use the opportunity of Erasmus+ mobility internship placements. This option is mostly used by students of the programme taught in English. Students from the Latvian stream have little interest in study exchanges and internships abroad. The most important reasons for this, as students admit, are lack of motivation, fear of the unknown, lack of finances, family commitments, work in Liepaja.

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

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

During the reporting period, a total of 61 students defended their final theses. Summarising the themes of the final theses, the highest share of themes is seen in the quality assurance category and in the software development and implementation category. A detailed summary of the categories can be found in Table 3.2.6.1. Note that a single topic can fit into several categories.

**Table 3.2.6.1.**

#### **Breakdown of the themes of final theses by thematic category by reference year**

Category	Reporting year									Total
	2013/ 2014	2014/ 2015	2015/ 2016	2015/ 2016	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	
<b>Number of final theses</b>	5	6	3	6	19	8	5	8	1	61

Cloud computing	0	0	1	0	1	1	0	0	0	3
Virtualisation	0	0	1	0	1	2	0	0	0	4
Internet of Things	0	1	0	1	0	0	0	0	0	2
Quality assurance	3	2	0	3	4	3	2	2	0	19
Robots	0	0	0	0	0	0	0	1	0	1
Virtual reality	0	0	0	1	1	0	0	0	0	2
Cybersecurity and data protection	0	1	2	0	3	0	0	0	0	6
Optimisation	0	0	1	1	0	1	0	0	1	4
Automation	0	1	0	0	1	0	0	1	0	3
Data analysis	0	1	0	0	0	0	0	1	0	2
Data processing and modelling	1	0	0	0	2	0	1	1	0	5
Software development and implementation	1	2	0	1	6	3	2	4	0	19
Knowledge management	1	0	0	0	3	0	0	0	0	4

The final papers also cover the top 20 most important technology trends identified by the Latvian Ministry of Economics: cloud computing (3 topics), Internet of Things (2 topics), robots (1 topic), cyber security and resilience (6 topics).

A summary of the final paper marks can be found in Table 3.2.6.2. The most common score is 7 (good), followed by 8 (very good) and 6 (almost good). The average grade for the final paper is also 7 (good).

**Table 3.2.6.2.**

**Summary of results of the final exams.**

Reporting year	Evaluation							Total
	4	5	6	7	8	9	10	
2013/ 2014				1	2	2		5

2014/ 2015	2		1		1	1	1	6
2015/ 2016			1	1	1			3
2016/ 2017			1	4	1			6
2017/ 2018	1	2	3	4	5	4		19
2018/ 2019	3.	1	1	1	1	1		8
2019/ 2020		1	2	2				5
2020/ 2021		2	2	1	3			8
2021/ 2022				1				1
<b>Total</b>	<b>6</b>	<b>6</b>	<b>11</b>	<b>15</b>	<b>14</b>	<b>8</b>	<b>1</b>	<b>61</b>
<b>Total (%)</b>	<b>10</b>	<b>10</b>	<b>18</b>	<b>25</b>	<b>23</b>	<b>13</b>	<b>2</b>	<b>100</b>

### 3.3. Resources and Provision of the Study Programme

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

LiepU infrastructure for the implementation of study programmes is good - in the equipped study halls there are possibilities to use audio, video and projection equipment, interactive whiteboards, as well as computer equipment and measuring equipment installed in computer classes and physics laboratory. To support the study processes, the Faculty supervises 10 laboratories, 11 thematic classrooms, and 11 computer classrooms. 8 laboratories are located at Lielā iela 14, 2 at Kr.Valdemara iela 4.

Laboratories:

- Computer networks and systems laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping laboratory (Lielā iela 14, room 004),
- Paper recycling laboratory (Lielā iela 14, room 003),
- Physics and mechatronics laboratory (Lielā iela 14, room 430),
- Ecotechnology laboratory (Lielā iela 14, Room 407),
- Environmental chemistry laboratory (Lielā iela 14, Room 407),
- High performance computing laboratory (Lielā iela 14, ),

- Smart technologies laboratory (Lielā iela 14, Room 427)
- Biogas laboratory (4 Kr.Valdemāra Street),
- Nanotechnology laboratory (Kr.Valdemāra iela 4).

Themed classrooms (14 Lielā iela):

- Software engineering classroom (with 18 computer workstations; room 415),
- Computer science and computer management classroom (with 13 computer workstations; room 416),
- Programming room (with 20 computer workstations; room 437),
- Programming room (with 18 computer workstations; room 434),
- Mathematics classroom (with 13 computer workstations; room 426),
- Computer graphics room (with 13 computer workstations; room 337),
- Videoconference room (with 9 computer workstations, room 426a),
- Computer room (with 18 computer workstations; room 343),
- Computer room (with 11 computer workstations; room 402),
- Nature embassy (Room 403),
- Circular economy centre (Room 003),
- Environmental biology room (Room 412).

They are supervised by support staff - LiepU IT centre engineers and DIF 3 lab technicians - chemistry, physics, natural sciences.

LiepU library is a support for LiepU students and teaching staff members in the process of study and research, where users have at their disposal the Subscription (issuing and receiving information resources), Copy Room (copying, printing, scanning and binding), Reading Room (reading information resources on site in the library) and Group Discussion Room (upon users' request).

The library offers free use of databases for both students and staff. Available databases include "EBSCO eBooks Academic Collection", "EBSCO Academic Complete", "Science Direct", "Cambridge Journals Online", "Scopus", "Web of Science", special offer for students by "Lursoft" - "Studenta komplekts", as well as "Mārketinga rokasgrāmata" and "Uzņēmuma vadītāja rokasgrāmata" by Letonika and Dienas Bizness.

The following library services are being used particularly actively in the context of the epidemiological precautions and restrictions imposed as a result of the Covid-19 pandemic: 1) on-demand digitisation (subject to copyright) of monographic materials and serials; 2) user self-service book-drop box in the university lobby for independent book check-out, where books were stored in quarantine; 3) user self-service self check for independent book check-out and check-in; 4) remote access to the library's electronic resources via VPN protocol.

The faculty offers unpublished student papers of the relevant profile - bachelor theses in computer science, mathematics and physics, diploma projects and master theses in information technology.

Specialised literature in mathematics, computer science, information technology, physics and didactic materials are available to students in specialised classrooms and laboratories. The reading room in the Institute of Natural Sciences and Innovative Technologies houses collections of scientific articles, journals and other scientific literature in the fields of mathematical modelling, physics and information technology. Some of the methodological materials are available to students in electronic form in the course management system Moodle.

### **3.3.2. Assessment of the study provision and scientific base support, including the**

**resources provided within the framework of cooperation with other science institutes and higher education institutions (applicable to doctoral study programmes) (if applicable).**

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

The funding of studies from the state budget is allocated each calendar year in accordance with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists. The calculation of the projected costs of the professional master study programme "Information technology" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.5 The cost per study place in 2022 is EUR 3 667,75.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,400 (in English - EUR 2,800) and it is fixed for the whole study period, the total tuition fee for 2 years is EUR 4,800 (in English - EUR 5,600), and for 4 years EUR 7,200. Minimum number of students per course for full-time study: 9 students.

Since 2012, in the budget of Liepaja University of Applied Sciences there has been established a budget for the development and implementation of study programmes. The budget is planned and used for organising students' learning processes outside the university, for upgrading the material and technical base of the programmes (including laboratories), for recruiting qualified staff, etc.

A faculty science budget has been established to support the research (creative) activities of academic staff. The budget is planned and used for conference fees, travel expenses, organisation of scientific and methodological seminars, development of international cooperation, attraction of guest speakers, etc.

Liepaja City Municipality funding is available for attracting academic staff to ensure the quality of studies.

The use of FSE funding is regularly reviewed at meetings of the Faculty Council and the teaching staff, and at meetings of the Senate Budget and Development Committee.

LiepU has established quality management system procedures that support the study process - personnel management, financial management, IT, library and economic resources management,

document management, project management, information circulation and public information management, as well as scientific and research management processes. For example, A-2-1 "Basic Budget Planning", A-2-2 "Basic Budget Execution and Control".

### 3.4. Teaching Staff

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

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the Study Programme" of this report (3. Resources and facilities of the field of study). All teaching staff - docents, including guest teaching staff, involved in the study programme comply with the conditions for the implementation of the study programme and the requirements of the regulatory enactments (e.g., the Law on Higher Education Institutions).

The teaching staff of the LiepU Faculty of Natural Sciences and Engineering, docents of other LiepU faculties and researchers of the Institute of Natural Sciences and Innovative Technologies (DITI), specialists of the LiepU Information Technology Centre (ITC), as well as some guest lecturers are involved in the implementation of the field of study. All lecturers have a Master's or a Doctoral degree. The qualification level of the academic staff involved in the implementation of the study programme by study year can be seen in Table 3.4.1.1, which shows the percentage and number of teaching staff with Master's and Doctoral degrees.

**Table 3.4.1.1. The level of qualification of the academic staff involved in the implementation of the study programme.**

Year	Number of teaching staff	Master's degree		Doctor's degree	
		Number	%	Number	%
2015/16	40	30	75	10	25
2016/17	42	30	71	12	29
2017/18	39	27	69	12	31
2018/19	41	28	68	13	32
2019/20	41	28	68	13	32

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2020/21	41	28	68	13	32
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Most of the teaching staff have a Master's or Doctoral degree in computer science or information technology. Some docents have degrees in pedagogy or educational sciences, specialising in teaching methods in informatics, mathematics or physics. Docents of general education courses have a master's or doctoral degree in social sciences (management, economics, law, etc.) The qualifications of the teaching staff involved ensure the knowledge and competence necessary to prepare and conduct classes and to organise independent study work to support students' professional development. Visiting lecturers from abroad add an international dimension to your studies. Invited IT professionals and lecturers, who work in IT companies alongside their university work, are able to pass on their practical work experience.

A total of 22 -27 teaching staff members are planned for the next accreditation period. The number of teaching staff involved in a given academic year will depend on the duration of the study programme (2 or 3 years) and the qualifications and modules chosen.

Characteristics of 27 teaching staff:

academic positions: 4 professors, 8 assistant professors, 15 lecturers;

education: 12 with a doctorate, 15 with a master's degree;

elected: 12 LiepUs elected, 15 LiepUs not elected.

The involved IT professionals work in IT companies, for example, Mg.sc.ing. M. Freimane (TestDevLab), MSc. Eng. A. Lagzdiņa (Like a Coffee), M.sc.ing. M. Sinka (SIA "MeaWallet Latvia"), Dr.sc.comp. Ē.Urtāns (asya.ai).

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

The changes in the composition of the teaching staff are mainly related to the generational change and the involvement of docents with doctoral degrees (Andra Krasāvina, Ēvalds Urtāns, Konstantīns Mantuļņukovs) or doctoral theses defences planned in the near future. In 2022 and 2023, the lecturers Linda Alksne, Kristīne Mackare and Uldis Žaimis are expected to defend their doctoral degrees in engineering. Kaspars Vārpiņš plans to complete his doctoral studies in social sciences, and Lilita Ābele in economics. Madara Freimane and Uldis Drišļuks have started their doctoral studies.

As a result of the DIF's collaboration with DITI in the specialisation areas of artificial intelligence and smart technologies, the study programme involves DITI's senior researchers and researchers, ensuring the implementation of research-based studies.

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the study programme" of this report (3. Resources and facilities of the field of study).

A total of 22 -27 teaching staff members are planned for the next accreditation period. The number of teaching staff involved in a given academic year will depend on the duration of the study programme (2 or 3 years) and the qualifications and modules chosen.

New teaching staff have been recruited for the implementation of new modules "Artificial Intelligence", "Smart Technologies" and "Sensor-based Systems", which correspond to current

trends in IT.

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

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

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

The teaching staff employed in the study programme cooperate in the development and implementation of joint research and projects within LiepU DITI, as well as in the development of the content of joint professional specialisation and theoretical courses in the field of study and in the exchange of information on current developments in the field and in the study process. The teaching staff members working in the study programme cooperate in the development and implementation of joint research and projects, and in the exchange of information on current developments in the field - through meetings at various industry exhibitions, international conferences, seminars and other networking events. Information exchange is ensured by regular meetings of the teaching staff at meetings organised by the Faculty and meetings within the framework of research activities at scientific institutes.

At the time of submission of the self-assessment report, the professional master's study programme "Information Technology" involved 23 teaching staff members for 22 students.

# Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Diploma_diploma_supplement_sample_InfTechn_M_ENG.pdf	Diploma_diploma_pielik_paraugi_InfTehn_mag_LV.pdf
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	APPENDIX_5_Statistical data on students in the study programme.docx	5_Statistika_IT_magistri.docx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	_P6_AtbitstibaAlstandartam_Mit_ENG.pdf	P6_AtbitstibaAlstandartam_Mit.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)	P7_AtbitstibaProfesijasStandartam_ENG.pdf	P7_AtbitstibaProfesijasStandartam_LV.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	P8_Kartejums_Mit_ENG.pdf	P8_Kartejums_Mag_LV.docx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	ITmagistri_LV_EN.xlsx	ITmagistri_LV_EN.xlsx
Descriptions of the study courses/ modules	P10_kursu_apraksti_ITmagistri_EN.pdf	P10_kursu_apraksti_ITmagistri_LV.pdf
Description of the organisation of the internship of the students (if applicable)	Regulations on internship in Liepaja University.docx	Noteikumi par praksi LiepU.docx
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		

# Computer Science (43484)

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
ProcedureStudyProgram.Name	<i>Computer Science</i>
Education classification code	<i>43484</i>
Type of the study programme	<i>Academic bachelor study programme</i>
Name of the study programme director	<i>Dzintars</i>
Surname of the study programme director	<i>Tomsons</i>
E-mail of the study programme director	<i>dzintars.tomsons@liepu.lv</i>
Title of the study programme director	<i>datorzinātņu maģistrs (Mg.sc.comp.)</i>
Phone of the study programme director	<i>29471460</i>
Goal of the study programme	<i>Provision of academic education in the field of computer science and information technology, providing the opportunity to obtain higher education, retraining and further education, which allows to fully function in education, culture, science and other fields in the dynamic conditions of democracy, communication, competition, information and culture in the interests of the Latvian state and the Latvian people.</i>
Tasks of the study programme	<ol style="list-style-type: none"> <li><i>1. Ensure the acquisition of competences corresponding to the requirements of academic bachelor's degree and higher education in computer science standard.</i></li> <li><i>2. Ensure the academic and applied research connection with coursework and scientific and professional problem solving, ensure student involvement in research on current problems of information technology and computer science.</i></li> <li><i>3. Promote the self-education needs satisfaction and involvement in further education.</i></li> </ol>
Results of the study programme	<ol style="list-style-type: none"> <li><i>1. The knowledge of computer science and mathematics, which provide understanding of computer science and information technologies, have been learned, and theoretical courses of computer science in all major computer science industries have been learned.</i></li> <li><i>2. The common knowledge of the information technology industry on the design of computer systems and the basic principles for building them, IT applications for natural, technical, and social process solutions, national and international standards of the IT industry and IT industry terms in Latvian and English, as well as advanced skills for the use of acquired knowledge in practice, has been acquired.</i></li> <li><i>3. Methods and technologies for programming, development and maintenance of computer systems have been learned.</i></li> <li><i>4. The skills needed to carry out independent studies in a selected computer science sub-sector have been acquired and developed.</i></li> <li><i>5. Knowledge, skills, and expertise in software engineering has been acquired and improved.</i></li> </ol>
Final examination upon the completion of the study programme	<i>Bachelor Thesis (12 creditpoints or 18 ECTS)</i>

# Study programme forms

## Full time studies - 3 years - latvian

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

## Places of implementation

<b>Place name</b>	<b>City</b>	<b>Address</b>
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 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>122</i>
Admission requirements (in English)	<i>Secondary education and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Bachelor of Natural Sciences in Computer Science</i>
Qualification to be obtained (in english)	<i>---</i>

## Places of implementation

<b>Place name</b>	<b>City</b>	<b>Address</b>
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 3.1. Indicators Describing the Study Programme

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

There have been no structural changes to the study programme during the previous reporting period. Its aims, objectives and structure have remained.

Since the content of the study program, in preparation for the evaluation of the study direction, is closely aligned with the content of the professional bachelor's study program "Information Technology", where its graduates obtain the qualification of "Software engineer", then the group of educational programs "484 - Programming" has been determined as the most suitable for this study program ". Thus, the new code of the study program is assign to 43484. The change of the code change has not significantly affected the quality of studies. However, preparing the changes of the study program for the current evaluation, the developers of the study program abandoned some in-depth courses in Artificial Intelligence and Smart Technology modules.

In response to the rapidly changing situation in computer science, IT industry and the field of technology, the content of several study courses has been updated (e.g. "Computer Graphics and Animation", "Algorithms and Data Structures", "Software Development Project Management", "Current Issues in Software Engineering", etc.), some study courses have been replaced by others whose content is more relevant to the requirements of computer science and IT industry and current technological trends (see Table 3.1.1.1.1).

**Table 3.1.1.1. Courses included in the study programme after the accreditation letter was issued**

<b>Previous study course</b>	<b>New study course</b>	<b>Course scope</b>	<b>Time period</b>
Non-linear computer video montage	Internet of Things	2	2nd sem.
IT industry laws and standards	Introduction to data processing systems	2	2nd sem.
Multimedia systems	Applications of artificial intelligence	2	3rd sem.
Probability theory and mathematical statistics II	Data processing systems	2	4th sem.
Software quality and testing	Software testing	2	4th sem.
Database technology II	Software and data quality	2	4th sem.

Physics (scope reduced from 4 CP to 2 CP)	Mobile apps	2	5th sem.
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The development and inclusion of the courses "Internet of Things", "Applications of artificial intelligence" and "Data processing systems" in the study programme was determined by the global trends in technology development, the requirements of the university partners - representatives of IT companies, as well as by the smart specialisation direction and sub-directions defined by the DIF and DITI. The content of the course "Introduction to data processing" meets the requirements of the programme development. Firstly, the course teaches students the basics of the Python programming language, which is required for the study courses "Internet of Things", "Applications of artificial intelligence" and "Data processing systems", as well as extending their knowledge and skills in the implementation of their projects. Secondly, the fundamentals of database design and SQL learned in the course "Introduction to data processing" enable students to develop more complex study projects (within the course "Study project (Software development)") as early as the end of the first year.

Major changes have been made to the study programme in preparation for re-accreditation. The study programme includes several study modules (see Table 3.1.1.2), each with a scope of 10 credit points. Each study module ends with the presentation and/or defence of a study project. The individual courses within the module are to be implemented in a compact sequence. This allows students to focus on a specific content and to take several courses consecutively in one semester.

**Table 3.1.1.2. Study modules**

Software development I	1st sem.
Software development II	2nd sem.
Software engineering I	3rd sem.
Software engineering II	4th sem.
Computer systems and networks	5th sem.
Applications of artificial intelligence*	5th sem.
Smart technologies *	5th sem.
Advanced course of the School of Computing *	5th sem.
Exchange semester at a partner university abroad *	5th sem.

In the 5th semester, students can choose modules on "Applications of artificial intelligence", "Smart technologies", "Advanced course of the School of Computing" and "Exchange semester at a partner university abroad" (one per semester). The module "Advanced course of the School of Computing" is recommended for students who wish to work as a teacher of computing in a school after their Bachelor's degree (after one year of study in the second-level higher professional education programme "Teacher" or after completing a 72-hour professional education course for teachers). The module "Exchange semester at a partner university abroad" provides the student with the opportunity to go to a LiepU partner university of his/her choice under the Erasmus+ or other student exchange programme, and up to 10 CP (or 15 ECTS) of successfully completed

study courses that have not been previously completed at LiepU are transferred. This reduces the burden of academic debt that a student may incur after returning from an exchange.

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

The scope of the study programme is 120 credit points or 180 ECTS; the study duration is 3 years, which is in accordance with the Cabinet of Ministers' Regulations on the State Standard of Academic Education (No. 240; 13.05.2014) The first two years provide the fundamentals of computer science and software engineering. After the second year of study, students are able to fully perform the duties of a programmer and tester in software projects. In the third year, students take (a) a course in computer systems and computer networks, (b) courses related to computer science research methodology and current issues, and (c) compulsory elective courses in applications of artificial intelligence, smart technologies or in the computer science specialisation offered by LiepU partner universities, and (d) develop a bachelor thesis. Students also study general education courses and mathematics, which develop students' abstract and critical thinking skills needed for self-directed further education, career development, interdisciplinary projects and innovation.

After completing the study programme, students obtain a Bachelor's degree in Computer Science, which is the name of the study programme.

Study programme code - 43484

- Education level: Higher education (4 - first digit)
- Type of education programme: academic education (bachelor's degree), to be completed after general or vocational secondary education; duration of full-time studies: three to four years; LQF - level 6 (43 - first and second digits);
- Education subject group: science, maths and information technology (4 - third digit);
- Subject area of education: computing (48 - third and fourth digits);
- Educational programme group: programming (484 - third, fourth and fifth digits)

The study program both by its title ("Computer Science") and by degree (Bachelor of Computer Science) corresponds to the field of study "Information technologies, computer engineering, electronics, telecommunications, computer management and computer science". The aim and tasks of the study program are focused on the preparation of highly qualified Computer Science specialists.

The study program is implemented in Latvian (national language) and in English. Studies in Latvian are provided for citizens of Latvia, and in English - for international students. In both language streams, the study program is implemented identically, except the course "Latvian language for international students" in the amount of 2 credit points (or 3 ECTS), which is an additional course for international students. Therefore, the amount of study program in Latvian is 120 credit points (180 ECTS), in English - 122 credit points (183 ECTS).

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

The study programmes are relevant to the STEM field and their development is prospective in terms of national development priorities[1] and is linked to the implementation of the strategy for smart specialisation[2]. The EM labour market analysis also shows that even with relatively high wages, it is already difficult to meet the growing demand for IT professionals. As a result, there is insufficient supply and high demand for IT specialists. This is because business models, methods and tools have changed significantly in recent years. The development of any industry requires large-scale IT services due to implementing a variety of digital solutions. This trend is also confirmed by the 2016 EM report "Labour Market Realignment for a Faster Growing Economy"[3], which predicts that the demand for science, mathematics and information technology specialists will increase in the future. Demand in this group is forecast to exceed supply by 126%.

Despite the relatively high supply of study programmes in Latvia, there is a shortage of at least 1000 IT specialists[4]; according to the Ministry of Economics, by 2020 there will be a shortage of more than 4200 IT specialists in Latvia. Unfortunately, according to the Tele2 SSC survey, only 12.7% of boys and 2.1% of girls pursue a career in IT[5].

The study programme is in line with Priority 3 of the Latvian strategy for smart specialisation "Increasing energy efficiency", Priority 4 "Development of a modern ICT system in the private and public sectors", Priority 6 "Developed knowledge base (basic science and scientific infrastructure) and human capital in knowledge areas". The Smart specialisation areas "Smart materials, technologies and engineering systems", "Smart energy" and "Information and communication technologies" correspond to these priorities. IT programmes train professionals to develop new products for modern and efficient public administration, e-services and digital content development, cross-border cooperation for the digital single market.

The development and activities of the programme are coordinated with the Kurzeme region sustainable development planning documents, as well as with the "Liepaja City Sustainable Development Strategy until 2030", which indicates Liepaja as an education, science and research centre, and emphasises the development of natural and engineering sciences in Liepaja.

The Ministry of Economy's "Informative Report on Medium- and Long-term Labour Market Projections"[6] notes that education policy has set a target to restructure state support for higher education studies in line with medium-term labour market projections. In 2020, the share of budget places in science and engineering (Natural Sciences, Mathematics and Information Technology thematic group and Engineering, Manufacturing and Construction thematic group) is expected to reach more than half or 55% of the total number of budget places (p.43). As well as proposals to improve labour market supply in higher education, it is pointed out (p.97) that the number of budget study places in engineering, information and communication technologies, pharmacy and agriculture should be further increased; the provision of universities with modern facilities, equipment and technologies in priority fields of study such as natural sciences, mathematics and information technologies, engineering, manufacturing and construction should be improved.

The study programme is designed to respond to the dynamic changes in the economic situation and the labour market regarding the need for ICT and engineering professionals. The results of labour market studies carried out in Latvia in recent years (Informative report of the Ministry of Economics on medium- and long-term labour market forecasts[7]) show the need and growing demand for ICT specialists. According to the Ministry of Economics' "Information Report on Medium

and Long-term Labour Market Projections"[8], even with relatively high wages, there are already difficulties in meeting the growing demand for IT specialists - programmers. As a result, there is insufficient supply and high demand for IT specialists. This is due to the fact that the business model has changed significantly in recent years. Any industry requires large-scale services from other industries, such as IT services.

The Latvian Information and Communication Technology Association (LIKTA) also states in its letter of support that "there is currently a catastrophic shortage of specialists in the information and communication technology sector. In addition, the training of skilled ICT professionals is a pressing problem not only in Latvia, but across Europe and, according to EU forecasts, by 2020 there will be a shortage of more than 900 000 ICT professionals in Europe in various sectors. According to the Digital Agenda Scoreboard, 40% of companies in the EU are currently struggling to fill ICT vacancies. In Latvia, the number of ICT companies is growing every year, which shows that the need for new professionals will increase." IT degree programmes should therefore be supported and developed to train new professionals.

Representatives of IT companies Emergn Latvia, Accenture Latvia, SIA "Microsoft Latvia", Giraffe360, TestDevLab, Like A Coffee, DEVS.LV are organising guest lectures on topical computer science topics. Liepāja University is a member of Latvian Information and Communication Technology Association (LIKTA), Electrical Engineering and Electronics Industry Association (LETERA), IT Cluster and Microsoft IT Academy Program.

Most of the graduates work in IT companies in Liepāja, for example, Emergn Latvija, Tieto Latvia, Giraffe360, TestDevLab, also in companies founded by Liepāja IT graduates "IT Līderis", PROGoteam, HighFive.lv, etc. Many graduates work in IT companies outside Liepāja, such as Accenture, MikroTik, "Like A Coffee", etc. Computer science graduates mostly work in the IT industry.

Graduates have wide opportunities to find a job in IT companies. For example, according to statistics by Lursoft, as of the beginning of 2022, 84 Information Technology companies are working in Liepāja, the Latvia's third largest city. After their studies, most of international students return to their home country, where they start working in local IT companies or in a well-paid position in government institutions as an IT specialist. Some of international graduates go to other countries of the European Union to start either their Master's studies or their professional career in IT companies

[1]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_videja_un_ilgtermina_prognozem)

[2] [http://viaa.gov.lv/lat/zinatnes\\_inovacijas\\_progr/viedas\\_sPECIALIZACIJAS\\_iev/viedas\\_spec\\_ieviesana/](http://viaa.gov.lv/lat/zinatnes_inovacijas_progr/viedas_sPECIALIZACIJAS_iev/viedas_spec_ieviesana/)

[3]

[https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j\\_salmins\\_\\_darba\\_tirgus\\_parkartojumi\\_ekonomikas\\_izaugsmei20160519.pdf](https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j_salmins__darba_tirgus_parkartojumi_ekonomikas_izaugsmei20160519.pdf)

[4]<http://nra.lv/latvija/izglitiba-karjera/153292-ikt-nozare-attistas-specialistu-trukums-arvien-izteiktaks.htm>; date of access:20.10.2015.

[5][http://www.tvnet.lv/tehnologijas/nozares\\_jaunumi/628033-tikai\\_21\\_meitenu\\_un\\_127\\_zenu\\_plano\\_savu\\_karjeru\\_saistit\\_ar\\_it\\_nozari](http://www.tvnet.lv/tehnologijas/nozares_jaunumi/628033-tikai_21_meitenu_un_127_zenu_plano_savu_karjeru_saistit_ar_it_nozari); 01.10.2016.

[6]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_videja_un_ilgtermina_prognozem),

[7]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_vidēja\\_un\\_ilgtermiņa\\_prognozem/](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_vidēja_un_ilgtermiņa_prognozem/)

[8]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_vidēja\\_un\\_ilgtermiņa\\_prognozem/](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_vidēja_un_ilgtermiņa_prognozem/)

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

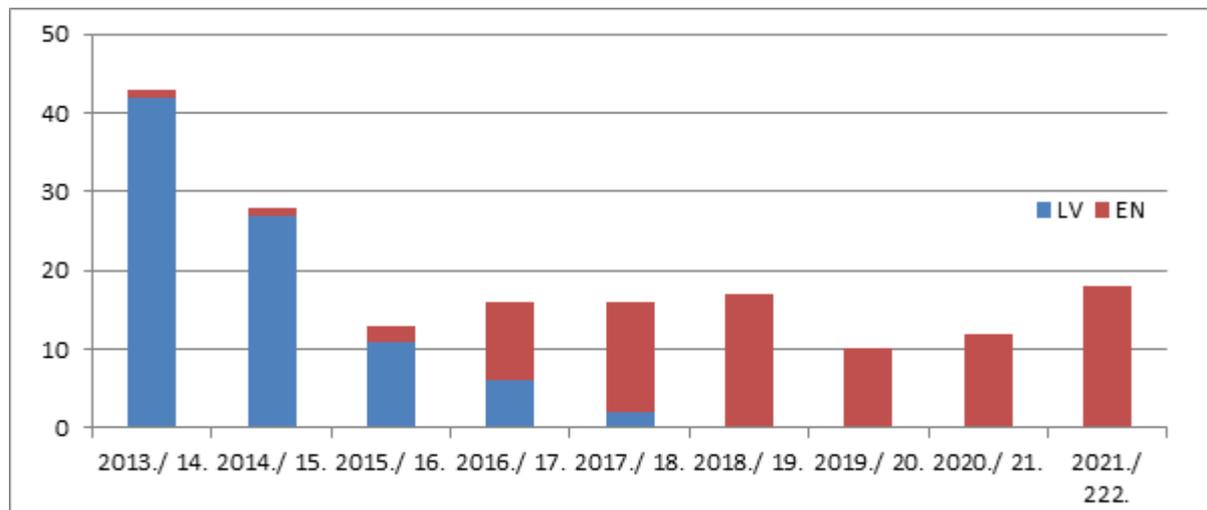
In the spring of 2022, 18 students are studying in the academic bachelor's study program "Computer Science" (all of them in English). The dynamics of the number of students since year 2013 are noted in the table 3.1.4.1. Table shows the changes in the total number of students in academic study program "Computer Sciences", as well as changes in the number of enrolled students in the first year of studies, the number of excluded students and the number of graduates.

Data is divided separately for Latvian and international flows of students' divided by spoken languages - Latvian (LV) and English (EN) in the table 3.1.4.1.

**3.1.4.1. Table. The dynamics of the number of students from year 2013 until 2022**

Study year	Total number of students			Students enrolled in the first study year			Excluded students			Graduates		
	In Total	LV	EN	In Total	LV	EN	In Total	due to failure in studies	by their own will	In Total	LV	EN
2013/14	43	42	1	10	10	0	11	2	9	9	9	0
2014/15	28	27	1	7	7	0	9	4	5	8	8	0
2015/16	13	11	2	1	0	1	5	2	3	4	3	1
2016/17	16	6	10	4	0	4	6	3	3	2	2	0
2017/18	16	2	14	12	0	12	6	0	6	3	1	2
2018/19	17	0	17	11	0	11	9	0	9	0	0	0
2019/20	10	0	10	4	0	4	5	1	4	0	0	0
2020/21	12	0	12	6	0	6	4	0	4	1	0	1
2021/22	18	0	18	9	0	9	5	1	4	1	0	1

3.1.4.1 Figure shows the changes in the total number of students over the years and the changes in the number of students matriculated in the first year of study over the years.



#### 3.1.4.1. Figure. Dynamics of the total number of students from year 2013 until 2021

Admission process has been stopped for the Latvian flow of students since year 2015, as most of the applicants had selected professional bachelor's study program "Information Technology" that is related to the academic study program "Computer Science".

In year 2015 the first international student was enrolled in the study program.

The number of newly admitted international students has gradually increased till year 2018, because of the activities organized by the International Relations Department of LiepU.

Unfortunately the number of international applicants significantly decreased in year 2020 and 2021 since they were not allowed to travel because of the strict governmental restrictions during the Covid-19 pandemic.

It must be admitted that there is a rather large number of excluded students among the international students. The main reasons are - lack of motivation, lack of prior knowledge (secondary education level), cultural differences (attitude, habits etc.).

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

## 3.2. The Content of Studies and Implementation Thereof

#### 3.2.1. Analysis of the content of the study programme. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators with the aims of the study course/ module and the aims and intended outcomes of the study programme. Assessment of the

**relevance of the content of the study courses/ modules and compliance with the needs of the relevant industry, labour market and with the trends in science on how and whether the content of the study courses/ modules is updated in line with the development trends of the relevant industry, labour market, and science.**

The development of the study programme is influenced by trends in the development and digitisation of global society. ICT products are playing an increasingly important role in the economy, in global, national and regional affairs, in education, in society and in the daily lives of individuals. Long-term forecasts point to a growing demand for professionals who can create, maintain and use digital products and services. According to the Latvian Information and Communication Technology Association (LIKTA) (likta.lv), the ICT sector is one of the most export-oriented sectors of the economy, for example, in 2021, 53% of the ICT sector's turnover was exported. According to the information gathered by the Liepāja Digital Innovation Park, at the beginning of 2022 there were 84 ICT companies operating in Liepāja. Some of them, together with Liepaja University and organisations (foundations and associations) interested in ICT and industry development, established the Liepaja Technology Cluster in 2020, which aims to promote IT skills at all levels, among different groups of society, attract highly qualified specialists, raise public awareness about technology and develop the Liepaja IT ecosystem. Representatives of ICT companies working in Liepaja have also pointed out at various meetings and seminars that software projects have been rejected due to lack of IT specialists.

In the development of the study programme content, determination of the aim, objectives, planned study results and study approaches the ACM guidelines "CC2020 - Computing Curriculum 2020" , "Software Engineering 2014 Curriculum Guidelines for Undergraduate Degree Programmes in Software Engineering (SE2014)" and project management guidelines "A Guide to the Project Management Body of Knowledge And The Standard for Project Management" (Seventh Edition, ANSI/PMI 990012021) were taken into account. Several proposals and ideas for the content of the study programme and approaches to its implementation have been gathered and analysed over the years in meetings with representatives of IT companies - both in discussions after the defence of bachelor and master theses in the study programme "Information Technology" and in specially organised seminars.

The achievability of the planned study outcomes and their relation to the study courses planned in the study programme can be seen in the study course mapping table (Annex 8).

The achievement of the aims, objectives and defined study results of the study programme "Computer Science" is ensured by the content of the study programme. The content of the study programme is implemented in the compulsory, compulsory elective and free elective study courses and in the development and defence of the bachelor thesis. For the compliance of study courses with the national academic education standard, see Annex 6.

Most of the courses are divided into 10 credit point (or 15 ECTS) modules, each of which culminates in a module project. The exceptions are a number of general education courses and maths courses that are scheduled outside the modules. Each semester, except the sixth and final semester, 1-2 modules are implemented. In the first semester, students take the module "Software development I", which ends with a practical presentation on programming problem solving. The second semester module focuses on the development of students' first software project - a web-based database system. In the third and fourth semesters, in the modules "Software engineering I" and "Software engineering II", students take courses that cover the full software life cycle. The third semester module concludes with the presentation of a prototype study project. At the end of the fourth

semester module, students present a web-based database system (more complex and extensive than in the second semester) and full documentation of the software project according to Latvian and international standards of software engineering. The second year project is an individual independent research project on a topic of interest in computer science and software engineering. First and second year students work on their projects in teams, usually with 3-4 people in each team.

In the fifth semester, students must take one compulsory module on "Computer systems and networks" and one compulsory elective module on "Applications of artificial intelligence", "Smart technologies", "Advanced course of the School of Computing" or "Exchange semester at a partner university abroad". The study module "Computer Systems and Computer Networks" provides knowledge and skills that graduates can later use as IT consultants, IT department managers or computer systems administrators in companies. In the sixth semester, students study research methodology in computer science and several courses related to current issues in computer science, and at the end they develop and defend a bachelor thesis.

Course descriptions are included in Annex 9.

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

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

Study programme courses take place in form of lectures, seminars, practical classes, tutorials, internships; through students' independent work; e-learning tools are available on Moodle <https://estudijas.liepu.lv/?lang=en> . In case of a small number of students, it is decided (in the FSE council and in the LiepU Study Council) for a greater proportion of independent work in the course, increasing the importance of the e-study environment Moodle.

The study programme is carried out in modules, with each module having a final project, assignment or set of assignments. Each course in the module contributes a part of the final project. This helps to reduce student workload and gives an insight into how different entities interact with each other, allowing a basic level understanding of how projects are implemented in a corporate environment.

Liepaja University Regulations on course/module examinations (link to the electronic document here:

[https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course\\_Module%20Examinations.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf)

Ensures objective assessment of students' knowledge and promotes systematic study work during the semester. The assessment of the programme follows generally accepted principles such as:

- The principle of assessment transparency, which is a set of requirements for the assessment of the learning outcome in accordance with the aims and objectives of the study programme and study courses;
- Summative principle for positive achievements, where the learning is assessed by summing positive achievements;
- the mandatory nature, which requires a pass grade for the entire content of the study programme;
- the principle of varied testing, using different types of tests to assess acquisition;
- the principle of reviewability, for which the University has established procedures for reviewing the marks obtained;
- the principle of relevance, which enables the assessment to demonstrate ability, knowledge, skills and competences at all levels of learning, in appropriate tasks and situations.

Examinations and assessments may use different forms of testing, such as oral, written, combined and computer-based. Consultations are available to students before exams.

The main forms of knowledge assessment are tests, quizzes, seminars, discussions, coursework, etc. Students' knowledge is also assessed at the end of their studies, mainly during the examination periods twice a year. To ensure a student-centred approach, the final assessment is predominantly a cumulative assessment, including the student's work throughout the course. This is done on a course-by-course basis, taking into account the specificities of each course.

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

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

**3.2.6. Analysis and assessment of the topics of the final theses of the students, their**

relevance in the respective field, including the labour market, and the marks of the final theses.

During the reporting period, a total of 28 students have defended their Bachelor's Thesis. The highest percentage of topics (14 topics or 50%) include software development and deployment. This can be explained by the academic interests of the staff members, offered topics (by academic staff or partner companies of the industry), interests of employers' as well as the fact that during their studies students develop several study projects together with the students of the professional Bachelor's study program "Information Technology", who at the end of their studies obtain the qualification of programming engineering. Content-wise, all defended Bachelor's Theses are academic research on some current problem of the bachelor's work and the Information Technology industry and its solution has been approved by developing a software product. Among of the several topics, there are also the ones which corresponds to the 20 most important trends in technology determined by the Ministry of Economics of the Republic of Latvia: Internet of Things (3 topics), Cyber security and resilience (1 topic). A detailed category can be viewed in the table 3.2.6.1.

**3.2.6.1. table. The topics of the Bachelor's Thesis divided into thematic categories by reference years**

Category	Reference year									Total
	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017./ 2018.	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	
<b>Number of the Final Thesis</b>	9	8	4	2	3	0	0	1	1	28
Virtualization		1								1
Internet of Things	2	1								3
Quality Assurance			1							1
Language digitization and processing	1		1							2
Cyber security and data protection		1								1
Optimization		1	1							2
Data processing and modeling	2		1					1		4
Software development and implementation	4	4		2	3				1	14

The grades of the Bachelor's Thesis are included in the table 3.2.6.2. The highest proportion is grade 7 (good) and grade 6 (almost good). Unfortunately, none of the Bachelor's Thesis has received the highest grade - 10 (with distinction). Only one Thesis has received a grade 9 (excellent). But 3 papers have received the lowest possible positive grade - 4 (almost satisfactory).

**3.2.6.2. table. The results for Bachelor's Thesis.**

Reference year	Grade							Total
	4	5	6	7	8	9	10	
2013/ 2014		2	1	4	1	1		9

2014/ 2015	1	1	2	1	3			8
2015/ 2016	1	1	1	1				4
2016/ 2017				1	1			2
2017/ 2018	1	1	1					3
2018/ 2019								0
2019/ 2020								0
2020/ 2021				1				1
2021/ 2022			1					1
<b>Total</b>	3	5	6	8	5	1	0	28
<b>Total (%)</b>	11%	18%	21%	29%	18%	4%	0%	100%

### 3.3. Resources and Provision of the Study Programme

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

LiepU infrastructure for the implementation of study programmes is good - in the equipped study halls there are possibilities to use audio, video and projection equipment, interactive whiteboards, as well as computer equipment and measuring equipment installed in computer classes and physics laboratory. To support the study processes, the Faculty supervises 10 laboratories, 11 thematic classrooms, and 11 computer classrooms. 8 laboratories are located at Lielā iela 14, 2 at Kr.Valdemara iela 4.

Laboratories:

- Computer networks and systems laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping laboratory (Lielā iela 14, room 004),
- Paper recycling laboratory (Lielā iela 14, room 003),
- Physics and mechatronics laboratory (Lielā iela 14, room 430),
- Ecotechnology laboratory (Lielā iela 14, Room 407),
- Environmental chemistry laboratory (Lielā iela 14, Room 407),
- High performance computing laboratory (Lielā iela 14, ),
- Smart technologies laboratory (Lielā iela 14, Room 427)
- Biogas laboratory (Kr.Valdemāra iela 4),
- Nanotechnology laboratory (Kr.Valdemāra iela 4).

Themed classrooms (14 Lielā iela):

- Software engineering classroom (with 18 computer workstations; room 415),
- Computer science and computer management classroom (with 13 computer workstations; room 416),
- Programming room (with 20 computer workstations; room 437),
- Programming room (with 18 computer workstations; room 434),
- Mathematics classroom (with 13 computer workstations; room 426),
- Computer graphics room (with 13 computer workstations; room 337),
- Videoconference room (with 9 computer workstations, room 426a),
- Computer room (with 18 computer workstations; room 343),
- Computer room (with 11 computer workstations; room 402),
- Nature embassy (Room 403),
- Circular economy centre (Room 003),
- Environmental biology room (Room 412).

They are supervised by support staff - LiepU IT centre engineers and DIF 3 lab technicians - chemistry, physics, natural sciences.

LiepU library is a support for LiepU students and teaching staff members in the process of study and research, where users have at their disposal the Subscription (issuing and receiving information resources), Copy Room (copying, printing, scanning and binding), Reading Room (reading information resources on site in the library) and Group Discussion Room (upon users' request).

The library offers free use of databases for both students and staff. Available databases include "EBSCO eBooks Academic Collection", "EBSCO Academic Complete", "Science Direct", "Cambridge Journals Online", "Scopus", "Web of Science", special offer for students by "Lursoft" - "Studenta komplekts", as well as "Mārketinga rokasgrāmata" and "Uzņēmuma vadītāja rokasgrāmata" by Letonika and Dienas Bizness.

The following library services are being used particularly actively in the context of the epidemiological precautions and restrictions imposed as a result of the Covid-19 pandemic: 1) on-demand digitisation (subject to copyright) of monographic materials and serials; 2) user self-service book-drop box in the university lobby for independent book check-out, where books were stored in quarantine; 3) user self-service self check for independent book check-out and check-in; 4) remote access to the library's electronic resources via VPN protocol.

The faculty offers unpublished student papers of the relevant profile - bachelor theses in computer science, mathematics and physics, diploma projects and master theses in information technology.

Specialised literature in mathematics, computer science, information technology, physics and didactic materials are available to students in specialised classrooms and laboratories. The reading room in the Institute of Natural Sciences and Innovative Technologies houses collections of scientific articles, journals and other scientific literature in the fields of mathematical modelling, physics and information technology. Some of the methodological materials are available to students in electronic form in the course management system Moodle.

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

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

The funding of studies from the state budget is allocated each calendar year in accordance with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists.

The calculation of the projected costs of the study programme "Computer science" for full-time studies for the period 2021-2022 is based on the base costs for 2021 (EUR 1630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2021 is EUR 2445.17.

The tuition fee for full-time studies for the 1st year of the academic year 2022/2023 approved by the Liepaja University Senate is EUR 2100 for citizens of Latvia and the European Union and EUR 2500 for citizens of other countries, and it is unchanged for the entire study period. The minimum number of students in a study year in the full-time on-campus study programme is 16.

Since 2012, in the budget of Liepaja University of Applied Sciences there has been established a budget for the development and implementation of study programmes. The budget is planned and used for organising students' learning processes outside the university, for upgrading the material and technical base of the programmes (including laboratories), for recruiting qualified staff, etc.

A faculty science budget has been established to support the research (creative) activities of academic staff. The budget is planned and used for conference fees, travel expenses, organisation of scientific and methodological seminars, development of international cooperation, attraction of guest speakers, etc.

Liepaja City Municipality funding is available for attracting academic staff to ensure the quality of studies.

The use of FSE funding is regularly reviewed at meetings of the Faculty Council and the teaching staff, and at meetings of the Senate Budget and Development Committee.

LiepU has established quality management system procedures that support the study process - personnel management, financial management, IT, library and economic resources management, document management, project management, information circulation and public information management, as well as scientific and research management processes. For example, A-2-1 "Basic Budget Planning", A-2-2 "Basic Budget Execution and Control".

## **3.4. Teaching Staff**

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

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the study programme" of this report (3. Resources and facilities of the field of study). All teaching staff, including guest lecturers, involved in the study programme comply with the conditions for the implementation of the study programme and the requirements of the regulatory enactments (e.g., the Law on Higher Education Institutions).

The teaching staff of the LiepU Faculty of Natural Sciences and Engineering, docents of other LiepU faculties and researchers of the Institute of Natural Sciences and Innovative Technologies (DITI), specialists of the LiepU Information Technology Centre (ITC), as well as some guest lecturers are involved in the implementation of the field of study. All lecturers have a Master's or a Doctoral degree. The qualification level of the academic staff involved in the implementation of the study programme by study year can be seen in Table 3.4.1.1. which shows the percentage and number of teaching staff with Master's and Doctoral degrees.

**Table 3.4.1.1. The level of qualification of the academic staff involved in the implementation of the study programme.**

Year	Number of teaching staff	Master's degree		Doctor's degree	
		Number	%	Number	%
2015/16	40	30	75	10	25
2016/17	42	30	71	12	29
2017/18	39	27	69	12	31
2018/19	41	28	68	13	32
2019/20	41	28	68	13	32
2020/21	41	28	68	13	32

Most of the teaching staff have a Master's or a Doctoral degree in computer science or information technology. Some docents have degrees in pedagogy or educational sciences, specialising in teaching methods in informatics, mathematics or physics. Docents of general education courses have a master's or doctoral degree in social sciences (management, economics, law, etc.) The qualifications of the teaching staff involved ensure the knowledge and competence necessary to prepare and conduct classes and to organise independent study work to support students' professional development. Visiting lecturers from abroad add an international dimension to the

studies. Invited IT professionals and docents, who work in IT companies alongside their university work, are able to pass on their practical work experience.

The number of elected teaching staff in the study program varies slightly from year to year, but it is around 25% of the total number of academic staff involved in the study program. For example, during the Spring term of 2022, 13 elected academic staff members worked in the study program, including 1 professor, 4 leading researcher, 3 assistant professors, 4 lecturers, 1 visiting professor (Bulgaria). The other involved academic staff members are specialists at IT companies or educators from other educational institutions.

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

Changes in the composition of the teaching staff are mainly due to generational changes. The study programme involves several LiepU IT Master's graduates and doctoral students (see more in Chapters 2.6.1 and 2.6.2 of this report). In most cases, the changes have taken place gradually, the successors of the courses have been provided with consultations by experienced colleagues. Consequently, the quality of studies has not been significantly affected.

Unfortunately, due to age and health reasons, two Doctors of science - Dr.math. Jānis Rimšāns and Dr.math. Karlis Dobelis have left the study programme. Their courses have been taken over by Dr.math.Šarifs Guseinovs and Dr.math.Dace Kūma. They have rich previous experience working with students in similar courses in other universities and good cooperation with J. Rimšāns and K. Dobelis before taking over study courses. Therefore, the quality of studies was not significantly affected by it, except that the opportunities to involve the doctor of sciences in the implementation of other courses decreased.

In 2022 and 2023, the lecturers Linda Alksne and Valdis Priedols are expected to defend their Doctoral degrees in engineering.

As a result of the DIF's collaboration with DITI in the specialisation areas of artificial intelligence and smart technologies, the study programme involves DITI's senior researchers and researchers, ensuring the implementation of research-based studies.

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the study programme" of this report (3. Resources and facilities of the field of study).

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

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

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

The teaching staff employed in the study programme cooperate in the development and implementation of joint research and projects within LiepU DITI, as well as in the development of the content of joint professional specialisation and theoretical courses in the field of study and in the exchange of information on current developments in the field and in the study process. The teaching staff members working in the study programme cooperate in the development and implementation of joint research and projects, and in the exchange of information on current developments in the field - through meetings at various industry exhibitions, international conferences, seminars and other networking events. Information exchange is ensured by regular meetings of the teaching staff at meetings organised by the Faculty and meetings within the framework of research activities at scientific institutes.

At the time of submission of the self-assessment report, the academic bachelor's study programme "Computer Science" involved 19 teaching staff members for 14 students. It should be noted that most of the study courses are organised in a joint stream with foreign students of the professional bachelor's study programme "Information Technology", of which there are 24 students.

# Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Diploma_Diploma_supplement_sample_CompScience_ENG.pdf	Diploma_un_diploma_pielikuma_paraugi_Datorzin_LV.pdf
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)	Nr_42_LiepU_Bak Datorzin_250_EN.docx	AIP_Nr_42_LiepU_Bak Datorzin_250.docx
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	A5_Statistics_Computer Sciences.pdf	P5_Statistika_Datzinatnes.pdf
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	P6_AtbitstibaValstsAlstandartam_Bdat_ENG.pdf	P6_AtbitstibaValstsAlstandartam_Bdat.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	P8_Kartejums_Bdat_ENG.pdf	P8_Kartejums_Bdat.pdf
The curriculum of the study programme (for each type and form of the implementation of the study programme)	Datorzinatnes_TipveidaPlans_LV.pdf	Datorzinatnes_TipveidaPlans_LV.pdf
Descriptions of the study courses/ modules	P10_kursu_apraksti_Datorzinatnes_EN.pdf	P10_kursu_apraksti_Datorzinatnes_LV.pdf
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)	Apliecinajums_5Doktori_Bdat_ENG.edoc	Apliecinajums_akad.person. 5profesori_Bdat_LV.edoc

# E-studies Technologies and Management (51482)

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
ProcedureStudyProgram.Name	<i>E-studies Technologies and Management</i>
Education classification code	<i>51482</i>
Type of the study programme	<i>Doctoral study programme</i>
Name of the study programme director	<i>Anita</i>
Surname of the study programme director	<i>Jansone</i>
E-mail of the study programme director	<i>anita.jansone@liepu.lv</i>
Title of the study programme director	<i>Dr.sc.comp.</i>
Phone of the study programme director	<i>26493697</i>
Goal of the study programme	<i>The programme is designed to develop interdisciplinary research in technology/e-learning at an international level in the knowledge society, which is currently located in different fields of science according to the traditional classifications of the industrial society; it provides an opportunity to learn existing and develop new research methods in e-learning and related fields.</i>
Tasks of the study programme	<i>To carry out applied research in sectors relevant to Latvia's economic development, in areas related to the transition to a digital economy; To create competitive products in knowledge management, mobile and collaborative technologies, e-products and services, designed to increase the efficiency of knowledge economy enterprises, fully exploiting the potential of technology and knowledge society organisations, as well as the results of interdisciplinary research.</i>
Results of the study programme	<i>1.Will be able to create competitive products in knowledge management, mobile and collaboration technologies, e-products and services. 2.Will be able to conduct academic and industrial interdisciplinary research and prepare it for publication in scientific journals. 3.Will be able to understand the needs of the knowledge society in the field of e-learning technologies to choose methods to meet these needs. 4.Will be able to initiate and prepare national and international eStudy research and development projects and manage such projects or parts thereof. 5.Able to follow the research and development of e-learning technologies in the world, evaluate the latest solutions and predict their impact. 6.Able to implement innovative e-learning courses and evaluate the results using the latest e-learning technology findings. 7.Able to create, develop and implement new ideas in the field of e-learning technologies</i>
Final examination upon the completion of the study programme	<i>Doctoral thesis (PhD thesis) draft</i>

# 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)	192
Admission requirements (in English)	<i>Master's degree in natural sciences, Master's degree in engineering, Master's degree in social sciences, Master's degree in arts and humanities, or higher education diplomas equivalent to these Master's degrees</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Doctor of Science (Ph.D.) in Electrical Engineering, Electronics, Information and Communication Technologies; or Educational Sciences</i>
Qualification to be obtained (in english)	---

## Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 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)	192
Admission requirements (in English)	<i>Master's degree in natural sciences, Master's degree in engineering, Master's degree in social sciences, Master's degree in arts and humanities, or higher education diplomas equivalent to these Master's degrees.</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Doctor of Science (Ph.D.) in Electrical Engineering, Electronics, Information and Communication Technologies; or in Educational Sciences</i>
Qualification to be obtained (in english)	---

## Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 3.1. Indicators Describing the Study Programme

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

The programme is being updated as the knowledge economy and society evolve. It produces highly skilled professionals who are able to keep pace with, and drive, industry changes at a high professional level.

Since the previous accreditation, active research in the field of e-learning technologies has continued in the areas of learning analytics, artificial intelligence, virtual reality, big data. The programme implementers have been involved in several research projects that are related to this topic in-depth (national research programme ARTSS - Prospective Technologies for Resilient and Secure Services). In June 2022, a new HorizonEurope project "TED4LAT Twinning in Environmental Data and Dynamical Systems Modelling for Latvia" was approved. Doctoral students are involved in international projects, and the findings are incorporated into the doctoral curriculum through new courses and updated course content.

### Course plan changes

The structure of the programme is in accordance with the Regulations of the Doctoral Programmes of the Liepaja University and Riga Technical University:

- Part A compulsory subjects - 15 (fifteen) CP;
- Part B compulsory elective subjects - 21 (twenty-one) CP;
- Part C free electives - 6 (six) CP;
- Part E scientific paper - 150 (one hundred and fifty) CP.

Total credit points: 192 CP.

Changes to Part A:

- The course "E-learning Technologies" - number of credit points increased from 10 CP to 15 CP,
- the course "Theory of Management" (5 CP) is moved to Part B.

The following changes have been made to Part B:

- the course "Theory of Management" (5 CP) is moved from Part A.

The following courses are not implemented:

- Mobile communication systems (5 CP)
- Telecommunications and computer networks (5 CP),
- Signal processing theory (5 CP),
- Distributed intelligent systems (5 CP),
- Current developments in information systems (10 CP),
- Structural modelling (10 CP),
- Advanced methods in computer systems design (10 CP),

- Higher education pedagogy (5 CP),
- Sustainable educational psychology (5 CP),
- Creating a learning environment conducive to the development of research capacities (5 CP),
- The basic principles of modern education and approaches to their implementation (5 CP),
- Teaching competences (5 CP),
- Educational research methodology (5 CP),
- Contemporary management theory (5 CP).

New courses:

- E-learning content technologies (5 CP),
- E-learning data research and analytics (5 CP),
- Data quality: methods, tools and techniques (4 CP),  
Cyber security and e-learning technologies (4 CP),  
Pedagogical strategies for personal socialisation (4 CP),
- Transformative education for personal fulfilment (4 CP),
- Dimensions of the quality of the learning environment (4 CP),
- Educational strategies for research literacy (4 CP),
- Higher education didactics (4 CP),
- Educational psychology (4 CP),
- Think Tank: pedagogical solutions for personal socialisation (4 CP),
- Think Tank: pedagogical solutions in the context of Transformative Education (4 CP).

In connection with the Cabinet of Ministers Regulation No. 322 (Riga, 13 June 2017 (Prot. No. 30, 18. §)) on the Latvian classification of education, the programme code must be changed. LR education classification code (ECC): **51 482**

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

The programme implementers actively follow the development of the priorities and orientations of the European Framework Programmes and update the research orientations of the doctoral programme accordingly.

#### **Programme results**

It will equip young doctors with the skills to work internationally, to conduct research in the field of knowledge society technologies and to bring new knowledge into education. They will bring new knowledge for the implementation of e-learning technologies in enterprises and the lifelong learning system.

The programme prepares highly skilled professionals for both large and complex projects and university jobs, in line with the needs of the future knowledge economy. Both LiepU and RTU plan to develop their main research areas:

- To carry out applied research in sectors important for Latvia's economic development
- To create competitive products in knowledge management, mobile and collaborative technologies, e-products and services, designed to increase the efficiency of knowledge economy enterprises, fully exploiting the potential of technology and knowledge society organisations, as well as the results of interdisciplinary research.

Doctoral students will be able to propose and prepare national and international e-learning research and development projects. They will be qualified to manage such projects or parts of projects.

Doctoral students will be able to assess which educational development projects are advisable in specific situations.

### **Form and duration of studies**

Full-time studies - 4 years

### **Degree to be obtained**

Doctor of Science (Ph.D) in Electrical Engineering, Electronics, Information and Communication Technologies

or Doctor of Science (Ph.D) in Education Science

**Admission requirements:** are harmonised with the requirements corresponding to the industry and the admission regulations of Liepaja University (please refer to the electronic link in Annex 1.2.A "The main internal normative regulations of Liepaja University"):

Master's degree in natural sciences, Master's degree in engineering, Master's degree in social sciences, Master's degree in arts and humanities, or higher education diplomas equivalent to these Master's degrees.

### **Entrance exams:**

- paper or publication  
Paper (10 to 15 pages) on the chosen research topic or problem in e-learning technologies or e-learning management or a scientific publication in the chosen sub-field.
- discussions about the relevance and social significance of the chosen research problem.

The study programme has two implementation streams - engineering and social sciences, with different professional specialisation courses in Part B.

The suitability of the candidate for the chosen field of study for obtaining a Doctor of Science degree is evaluated by the admissions committee.

The program is implemented in Latvian and English. The duration, scope and content of the program are the same in both languages.

The title, code, degree of the study programme correspond to the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science". (See the electronic link in Annex 1.2.A. Main internal normative acts and regulations of the University of Liepāja. Development Strategy of the University of Liepāja 2016-2020 TERM EXTENDED UNTIL 2023)

Study programme code - 51482

- Education level: Higher education (5 - first digit)
- Type of education programme: Doctoral studies (doctoral degree), which can be carried out

- after obtaining a master's or professional master's degree (51 - first and second digits);
- Education subject group: science, maths and information technology (4 - third digit)
- Subject area of education: computing (48 - third and fourth digits);
- Group of educational programmes: computer skills (482 - third, fourth and fifth digits)

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

In the 21st century, educational technology is evolving faster than ever before both in Latvia and around the world. The global education market is bigger than the global energy market.

E-learning technologies have been developing rapidly for more than 20 years. While twenty years ago the dominant challenge was to transfer traditional educational methods to the digital environment, now the main challenges are related to the educational models of the digital age. In the last decade, new educational technologies and new research areas have emerged - MOOC, learning analytics, artificial intelligence, virtual reality, blockchain. The COVID-19 pandemic gave a sharp push to the development of e-learning technologies. At the same time, it should be noted that decisions on digital solutions in the COVID-19 context were rapid and political - they were not sufficiently informed by e-learning technology researchers. Researchers are currently working to interpret and generalise the educational experience of the COVID-19 period. Rapid developments are expected in the future as a coherent education model for the digital age is still being developed.

The doctoral study programme "E-Learning Technologies and Management" prepares highly qualified specialists of international level (doctors of science) in the sub-discipline of E-Learning Technologies and Management, providing the theoretical and practical knowledge necessary for the implementation and management of independent scientific research work, development and use of new technologies in the design and implementation of various information systems related to digital age education in various educational situations.

The content of the study programme and its implementation is based on the existing laws and regulations of the Republic of Latvia, the principles of doctoral education recommended by the European University Association, the EQUAL Guidelines for Doctoral Studies of May 2016, the United Nations Sustainable Development Goals in Higher Education, taking into account both the general and specific strategic development goals and objectives of the Faculty of Science and Engineering. The uniqueness of the programme lies in the interdisciplinary research in different educational situations. The level of technological development and the diversity of scientific challenges create the need and opportunity for doctoral students with different backgrounds.

Doctoral studies build the intellectual potential needed for the country's economic development. According to the document "Latvian Sustainable Development Strategy 2030", long-term investment in human capital is needed to promote human resource renewal, which is why the demand for doctor's degree in the Latvian labour market is very high. A key indicator of demand is graduate employment.

Graduates of the doctoral study programme are able to manage Latvian and European scientific and engineering projects in both companies of the industry and scientific institutions. Graduates of the study programme are specialists of the highest qualification in E-learning technologies and work in Latvian higher education institutions, research institutes, training centres, state institutions and

other organisations related to education in the digital age. Graduates work, for example, at Liepaja University, at Liepaja City Municipality institutions and educational institutions.

The doctoral programme is implemented in cooperation with RTU.

During the reporting period, 6 doctoral students obtained their doctoral degrees.

**Graduates:**

- L.Ulmane-Ozoliņa (LiepU)
- A.Jakabsone (Krasavina) (LiepU)
- J.Kapenieks (RTU)
- G.Majore (RTU)
- I.Vītoliņa (RTU)
- A.Gorbunovs (RTU)

in 2022-2023, 8 doctoral students plan to defend their doctoral theses:

- K.Bārdule (LiepU)
- L.Aksne (LiepU)
- K.Mackare (LiepU)
- J.Turlisova (LiepU)
- V.Priedols (LiepU)
- I.Daugule (RTU)
- E.Mirķe (RTU)
- L.Dzelzkalēja (RTU)

All graduates are employed as teaching staff and researchers at the respective university.

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

The doctoral study process is based on each doctoral student's individual annual plan, which is developed for the degree to be obtained and the specifics of the doctoral research, taking into account additional factors besides the compulsory doctoral courses: planned mobility and internships abroad, involvement in research projects (their approval or rejection is unpredictable), teaching work at the university (the workload is variable), factors caused by the COVID pandemic, etc. For these reasons, and because of sideline jobs, doctoral students often choose academic leave, interrupt their studies, do not defend their doctoral thesis at the end of the 4th year of study, and continue to develop their doctoral research after the completion of theoretical studies. Given the high degree of adaptation of the study process, the large number of influencing factors, the small total number of students, the quantified distribution of students is statistically not very informative. Fluctuations in the total number of students are directly related to the specifics of the organisation of the study process. The average number of students enrolled during the reporting period is 2-3 per year. 2 LiepU doctoral students have defended their doctoral theses so far (they received EU Structural Funds doctoral students' grant funding).

A number of activities are carried out to promote student enrolment, success and graduation:

- Active cooperation with Latvian universities, especially RTU, to promote the enrolment of new doctoral students and the joint supervision of doctoral students;
- Active cooperation with other LiepU faculties and institutes, such as the Faculty of Pedagogy and Social Work, the Institute of Educational Sciences, in order to promote the enrolment of new doctoral students and the overall supervision of doctoral students;
- Doctoral Schools are organised annually together with RTU, Vidzeme University of Applied Sciences and Rezekne Academy of Technologies;
- RTU Distance Learning Centre's bi-weekly research seminars, which discuss doctoral students' current work, recent research results and opportunities for new projects;
- LiepU SAM project funding for 3rd and 4th year of study as well as for doctoral candidate grants is focused on academic work experience and thesis development and defence (8.2.2.0/18/I/003 Development of Liepaja University academic staff in strategic specialisation areas - speech therapy, pre-school education and primary education; 8.2.2.0/18/A/021 Development of Liepaja University academic staff in strategic specialisation areas - natural sciences, mathematics and information technologies, arts, social sciences, commercial sciences and law; 8.2.2.0/20/I/007 Academic career of the staff of Liepaja University: quality and sustainability of doctoral studies);
- Active involvement of doctoral students in research projects (TED4LAT project 2022-2025, "Neural processing of affective and distorted vocal stimuli during movement tasks: EEG Study" (No. Izp-2021/1-0159)) gives doctoral students the opportunity to get to know the international scientific community and to present their research within the project activities;
- Active work with doctoral students who have completed the theoretical course, to encourage them to develop and defend their thesis after completing their doctoral studies;
- Methodological and organisational support for doctoral students' participation in scientific conferences in order to promote the publication of doctoral students' research results (e.g. 1.1.1.5/18/I/018 Promoting Research, Innovation and International Cooperation in Science at Liepaja University; 1.1.1.3/18/A/004 "Kurzeme Innovation Grants for Students" (KInGS);
- Participation of doctoral students in Horizon Europe events organised by the European Commission. Doctoral students get to know the European Research Area;
- Involvement of doctoral students in the preparation of the European Commission's Horizon Europe project proposals, these skills enable a better understanding of future developments in e-learning technologies and develop the capacity to create new jobs;
- A new Horizon Europe TED4LAT project (Twinning in Environmental Data and Dynamical Systems Modelling for Latvia) is approved. The project foresees doctoral schools in Latvia, Italy and France in 2023, 2024 and 2025. Three-month research visits are planned to Italy (POLITECNICO DI TORINO) and France (INSTITUT NATIONAL DE RECHERCHE POUR L'AGRICULTURE, L'ALIMENTATION ET L'ENVIRONNEMENT).

Each year, RTU and LiepU admit 1-4 doctoral students. Statistical data on doctoral thesis topics are summarised in section 3.2.6.

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

The programme is implemented jointly with Riga Technical University on the basis of an agreement

concluded in 2007. The programme implementers (RTU and LiepU) are preparing the programme for licensing as a joint programme. Attached is a draft cooperation agreement between RTU and Liepaja University for 2022.

Two programs were created when the Law on Higher Education Institutions did not provide the creation of a joint program. Documentation is currently being prepared to transform both programs as a joint program.

In 2023, it is planned to provide a joint study program for licensing. If the joint program is licensed, then students will transfer to the joint program. When all the students have transferred to the joint program, we estimate that the program will be integrated to the new joint program.

## 3.2. The Content of Studies and Implementation Thereof

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

The programme is designed to develop interdisciplinary research in technology/e-learning at an international level in the knowledge society, which is currently located in different fields of science according to the traditional classifications of the industrial society; it provides an opportunity to learn existing and develop new research methods in e-learning and related fields. In the field of e-learning, research is evolving in tandem with the development of e-learning itself. The research uses both traditional information technology and educational research methods, as well as *Living Lab* methods.

The **results of the programme** will equip young doctors with the skills to work internationally, to conduct research in the field of knowledge society technologies and to implement new knowledge in education. They will bring new knowledge for the implementation of e-learning technologies in enterprises and the lifelong learning system.

The programme prepares highly skilled professionals for both large and complex projects and university jobs, in line with the needs of the future knowledge economy. RTU and Liepaja University plan to develop key research areas:

- To carry out applied research in sectors relevant to Latvia's economic development, in areas related to the transition to a digital economy;
- To create competitive products in knowledge management, mobile and collaborative technologies, e-products and services, designed to increase the efficiency of knowledge economy enterprises, fully exploiting the potential of technology and knowledge society organisations, as well as the results of interdisciplinary research.

Doctoral students will be able to propose and prepare national and international eLearning research

and development projects. They will be qualified to manage such projects or parts of projects.

Doctoral students will be able to assess which educational development projects are advisable in specific situations.

The aims and objectives of the study programme are in accordance with the LiepU Doctoral Programme Development Plan 2020-2026.

Information included in study courses/modules, achievable results, set goals, etc. the interlinking of the indicators with the goals and achievable results of the study program is shown in the mapping (see appendix P08\_3.2.1\_EStudijas\_Kartejums\_Iv\_Mapping\_eng.docx).

The content of the study courses is updated according to the development trends of the industry, labor market and science. The content of study courses is updated according to research trends in European research and educational development programs. The content of study courses/modules is updated accordance with the QMS procedure S-7-II Management of changes in study courses (See Annex)

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

Interdisciplinary theoretical courses are designed to provide an in-depth understanding of the general theoretical framework, research methodology and the structure of the thesis.

The *E-Learning Technology* exam covers the latest knowledge, concepts and theories in e-learning technology and management.

Restricted elective courses deepen doctoral students' expertise in their chosen research areas. The restricted elective exam can be taken together or in parts, depending on the organisation of the exam process at the university.

Free elective courses are selected by the doctoral student from the university-approved catalogue of free elective courses or doctoral courses/summer schools in e-learning research from other universities around the world. Doctoral students are also involved in the preparation and implementation of new e-learning research and development projects. This enables the theoretical and practical knowledge gained during doctoral studies to be applied in the development of new e-learning courses or research projects.

Looking at the branches and sub-sectors of science in the EU classification, we see:

- E-learning research is part of telematics, which in turn is part of technological sciences;
- Research on e-content is part of IT research;
- Educational multimedia is a research field in the educational sciences.

The doctoral programme is also aimed at promoting the transformation of traditional economic sectors on a more productive technical and technological basis, as well as the creation of new sectors, unprecedented in Latvia, based on new knowledge and modern technologies, thus levelling regional disparities in labour force employment and promoting socio-economic development.

The doctoral programme in e-learning research develops a holistic approach, both by referring to the latest EU science policy documents and the priorities of the National Development Plan (NDP) of the Republic of Lithuania, and by learning in a targeted way from the mistakes recently made by the global economy (the internet bubble and the global crisis).

The doctoral programme develops international research in e-learning. It provides an opportunity to learn existing and develop new research methods for e-learning and related fields.

The programme prepares highly skilled professionals for both large and complex projects and for jobs in universities, in line with the needs of tomorrow's knowledge economy.

The programme comes from active participation in the EU's 5th, 6th and 7th Framework Programme projects to identify the capabilities and methods that will determine Latvia's success in tomorrow's knowledge economy.

In order to strengthen the capacity of the doctoral programme in advanced data processing, the programme has submitted and received a positive evaluation for the project "Twinning in Environmental Data and Dynamical Systems Modelling for Latvia (TED4LAT)" in 2022. This will give doctoral students the opportunity to learn dynamic modelling and carry out research at international level.

RTU and the University of Liepaja plan to develop the following main research directions:

- To carry out applied research in sectors important for the development of the Latvian economy in those areas related to the transition to the digital economy;
- To create competitive products in knowledge management, mobile and collaborative technologies, e-products and services designed to increase the efficiency of knowledge economy enterprises, making full use of the potential of technology and knowledge society organizations, and the results of interdisciplinary research.

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

The doctoral study programme "E-Learning Technologies and Management" is implemented in the amount of 192 CP in full-time on-campus studies (8 semesters).

Studies and research work are carried out according to a study plan individually developed for each doctoral student, which is approved at the start of studies and is regularly monitored during the course of studies.

The doctoral thesis is the doctoral student's main work, which must independently produce new scientific results. They must be published and presented in the form of a doctoral thesis. Doctoral dissertation must be prepared for submission to the doctoral council. The main results of the dissertation must be published in relevant scientific journals and presented at scientific conferences. The doctoral thesis involves the preparation and submission of appropriate

documents. The supervisor approves the doctoral student's individual plan, advises on the development of the research, recommends the place of publication and the choice of conferences. The doctoral student is responsible for the completion of all documents.

The evaluation system in the doctoral study programme is specified in the LiepU Doctoral Studies Regulations and the LiepU Doctoral Councils Regulations. The Council of the Doctoral Study Programme "E-Learning Technologies and Management" shall coordinate the requirements included in the Regulations, Rules and other normative documents of LiepU.

In accordance with the RTU and LiepU Doctoral Studies Regulations, at the end of each academic year a doctoral student is attested for the evaluation of his/her individual work. The opinion of the Faculty of Science and Engineering (LiepU) or RTU Faculty of E-Learning Technologies and Humanities (ETHZF) (RTU) on the doctoral student's thesis is recorded and submitted to the Vice-Rector of Science. In case of a repeated negative evaluation, a decision is made to dismiss the doctoral student (the dismissal procedure is organised in accordance with the Regulations on Doctoral Studies).

The requirements for the theoretical courses of doctoral studies, their activities and forms of examination are included in the course programmes. Theoretical courses are evaluated in 10 point system according to LiepU regulations on course/module examinations ([https://www.liepu.lv/uploads/dokumenti/studentiem/Noteikumi%20par%20studiju%20kursa\\_modula%20parbaudijumiem\\_speka%20no%2001.09.2022.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Noteikumi%20par%20studiju%20kursa_modula%20parbaudijumiem_speka%20no%2001.09.2022.pdf)).

The type of doctoral work, the assessment of the results and the credit points obtained are recorded in the doctoral student's study record.

The procedure for the development and defence of doctoral theses is determined by Cabinet of Ministers Regulation No.1001 "Procedures and Criteria for the Conferral of Doctoral Degree in Science" (27.12.2005) According to these rules, the doctoral degree is awarded for a particularly significant, original, independently carried out scientific qualification work (a thematically coherent set of scientific publications, a thesis or a monograph), which can be assessed as a significant contribution to the development of e-learning technologies. The main results of the thesis should be published and validated in international conferences.

The defence of the thesis at the Doctoral Council takes place only after its positive evaluation by the State Scientific Qualification Commission. The applicant shall submit the following no later than three months before the defence of the doctoral thesis to the Doctoral Council:

- Doctoral thesis.
- A summary of the thesis in Latvian and English;
- Evidence of completion of the study programme and passing exams in the chosen subject and foreign language;
- an autobiography (Curriculum vitae)
- List of published papers.

The Doctoral Council sends the submitted thesis to the committee for evaluation. The committee evaluates the applicant's work and, if the evaluation is positive, appoints an independent international expert and notifies the Doctoral Council. After a positive evaluation by the committee:

- the chairman of the Doctoral Council invites three reviewers, one of whom is an expert from the Council and two from other scientific institutions. Thesis reviewers may be Latvian or foreign scientists who are international experts in the relevant field of science;

the Doctoral Council shall determine the time of the meeting and announce it two weeks in advance in the newspaper Latvijas Vēstnesis and the newspaper Zinātnes Vēstnesis

The doctoral program "E-Study Technologies and Management" is implemented in cooperation with Riga Technical University. Liepāja University provides seven study courses in the field of educational science and one in the field of engineering science. Riga Technical University provides five study courses in the field of engineering and two courses in the field of educational science.

For obtaining a Doctor of Science degree in electrical engineering, electronics, information and communication technologies, the candidate defends it at the RTU Doctoral Council, while the Doctor of Science degree in education science defends at the LiepU Doctoral Council (see Draft LiepU\_RTU\_Agreement).

For example, RTU doctoral student J. Kapenieks defended his doctoral thesis in 2013 at LiepU's Doctoral Council, LiepU doctoral student A. Jākobsone defended her doctoral degree thesis at RTU's Doctoral Council in 2016.

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

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

The academic doctoral study programme covers research in all areas of technological and pedagogical solutions for e-learning in relation to the implications for sustainable development of society. The aim of the study programme is to develop the knowledge and skills necessary for research work in the e-learning technologies and management sub-field, as well as to prepare students for independent research.

The studies are based on the doctoral student's individual work plan, which is developed taking into account the needs of the doctoral student and the specifics of the doctoral thesis. A standard plan is used for the selection of study courses, but the student can create an individual plan, taking into account the relevance of the study courses to the dissertation research topic. Students have ample opportunities to plan their studies independently.

The work completed in the study courses is recorded in the work plan execution section, and the execution is approved by the LiepU Faculty of Science and Engineering Council. The planned workload can be carried out over several semesters.

Evaluation of study results at LiepU is carried out in accordance with LiepU regulations on course/module examinations ([https://www.liepu.lv/uploads/dokumenti/studentiem/Noteikumi%20par%20studiju%20kursu\\_modula%20parbaudijumiem\\_speka%20no%2001.09.2022.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Noteikumi%20par%20studiju%20kursu_modula%20parbaudijumiem_speka%20no%2001.09.2022.pdf)) and the LiepU Regulations for Doctoral

Studies.

Pedagogical methods, course structure and evaluation methods are selected by the teaching staff responsible for the study course in accordance with the content of the study course and the specifics of the study programme. Courses and seminars on the latest teaching and pedagogical methods are organised for academic staff, as well as attendance of qualification improvement courses is promoted both in the internal events of the faculty, LiepU and at the international level. The participation of LiepU in the ERASMUS+ programme ensures the improvement of academic staff qualification at the international level.

The specific assessment criteria for each course of study must be communicated to the students by the teaching staff in the first lesson and published in the e-learning environment of the course of study.

The progress of the thesis is monitored at two levels:

- regular meetings with the supervisor;
- reporting to the Faculty of Science and Engineering Council (at least once per academic semester).

The study programme is implemented in close collaboration with the thesis supervisor. In addition, doctoral students are attested at the end of the academic year (in accordance with the LiepU Doctoral Studies Regulations). This type of implementation mechanism of the Study programme ensures the achievement of learning outcomes.

Doctoral students shall be transferred to the next academic year by the order of the Dean of the Faculty, based on the decision of the Faculty Council, and subject to the following minimum requirements in the preparation of publications and the elaboration of the doctoral thesis:

1st year doctoral student:

- At least one scientific article published or accepted for publication.

2nd year doctoral student:

- At least one scientific article published.
- One scientific journal article published or accepted for publication.
- The doctoral thesis is approximately about 30% complete.

3rd and 4th year doctoral student:

- At least one scientific article published.
- One scientific journal article published.

The doctoral thesis is approximately 75% complete.

The theses are defended either at the RTU "P-21" Doctoral Council, which is entitled to award the degree of Doctor of Science (Ph.D.) in the engineering sub-discipline "E-learning technologies", or at the LiepU Doctoral Council for educational sciences.

The research and theses developed and defended are of high added value for the development of science and the economy.

Doctoral graduates continue to work in higher education institutions or provide guest lectures, where the results of research carried out in doctoral theses are incorporated into the content of the study process, ensuring the transfer and further use of knowledge.

Most of the insights and know-how from doctoral students' theses are integrated into new research

project proposals.

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

The thesis topics (field of research) are selected when students apply for admission to the programme. At the same time, the programme director recommends a potential supervisor and consultants. At the beginning of doctoral studies, each doctoral student is assigned a thesis supervisor supported by the Faculty of Natural Sciences and Engineering by the order of the LiepU Vice-Rector of Science. The topic of the doctoral thesis is specified shortly before the thesis defence.

Research topics of doctoral thesis of the doctoral study programme "E-learning Technologies and Management" - technological solutions of e-learning environment, e-learning personalisation, user interfaces, e-learning pedagogical solutions, e-learning efficiency enhancement, e-solutions in society, etc.

The developed study programme is oriented towards addressing the issues of this research topic, as its aim is to prepare internationally competitive top-qualified e-learning e-solutions specialists for academic and scientific work in universities, scientific research centres, as well as for work in public, private and international educational and other institutions, who have developed skills related to e-solutions technologies, are able to critically solve problems, including in research and innovation, are able to provide new insights and solutions.

Graduates of the doctoral study programme "E-Learning Technologies and Management"" have carried out research in the following areas:

- ICT for flipped classroom learning in primary education (self-regulated, cooperative, problem-based learning);
- Video lectures as code analysis in a blended learning module;
- A knowledge sharing simulation model to foster sustainable cooperation between adult learning institutions and enterprises;
- Technological support for the implementation of a collaborative learning pedagogical approach in combined studies;
- Educational action research in e-learning environment.

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

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

The **material and technical base of the Liepaja University** is available for students and teaching staff of all study programmes. In the LiepU buildings at Lielā iela 14 and Kūrmājas prosp. 13, there are 320 computers, 23 video projectors, 7 interactive whiteboards, 6 photocopiers, 11 cameras, 7 camcorders available. Each of the university buildings has a wireless open access network (36 wireless access points in total). A workstation virtualisation solution has been implemented and three computer classes are equipped with workstation clients (63 workstations in total). Their own virtual computer is created for students, which is not connected to a workplace. This solution ensures the mobility and security of the study process. Modern network hardware has been installed to virtualise the computer network and a CAMPUS computer network connection has been established between all university buildings.

Interdisciplinary study opportunities are provided by the material and technical facilities of the Faculty of Science and Engineering and the laboratory of the Institute of Natural Sciences and Innovative Technologies.

To support the study processes, the Faculty supervises 10 laboratories, 11 thematic classrooms, and has a total of 10 computer classrooms. 8 laboratories are located in Lielā iela 14, 2 in Kr.Valdemāra iela 4).

Laboratories:

- Computer networks and systems laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping laboratory (Lielā iela 14, room 004),
- Paper recycling laboratory (Lielā iela 14, room 003),
- Physics and mechatronics laboratory (Lielā iela 14, room 430),
- Ecotechnology laboratory (Lielā iela 14, Room 407),
- Environmental chemistry laboratory (Lielā iela 14, Room 407),
- High performance computing laboratory (Lielā iela 14, ),
- Smart technologies laboratory (with 8 computerised workstations; room), Biogas laboratory (Kr.Valdemāra iela 4),
- Nanotechnology laboratory (Kr.Valdemāra iela 4).

Themed classrooms (Lielā iela 14):

- Software engineering classroom (with 18 computer workstations; room),
- Computer science and computer management classroom (with 13 computer workstations; room),
- Programming room (with 20 computer workstations; room 437),
- Programming room (with 18 computer workstations; room 434),
- Mathematics classroom (with 13 computer workstations; room 426),
- Computer graphics room (with 13 computer workstations; room 337),
- Videoconference room (with 9 computer workstations, room 426a),
- Computer room (with 18 computer workstations; room 343),
- Nature embassy (Room 403),
- Circular economy centre (Room 003),
- Environmental biology room (Room 412).

They are supervised by support staff: The IT Centre and 3 lab technicians from the Faculty of Science and Engineering.

For specialised interdisciplinary research, there are also methodological classrooms of the Faculty

of Pedagogy and Social Work and the speech and voice research laboratory of the Speech Therapy Centre, as well as the art research laboratory of the Faculty of Arts and Humanities.

### **Material and technical support at RTU**

Infrastructure and material and technical support consists of teaching and research facilities, a library and IT support.

The necessary facilities for teaching and research, including the necessary IT support, are available for the implementation of the study programme:

- Renovated lecture halls and computer classrooms (ETHZF, Kronvalda bulvaris 1, Riga), including video projection, interactive control panels and a computer for the lecturer.
- A new computer classroom (ETHZF, Kronvalda bulvaris 1, Riga) with high-performance computers and advanced software, including video projection, interactive dashboards, usability testing hardware and software.
- Video studio (Media Centre, Āzenes 12, Riga) and MOOC learning materials lab (ETHZF, Kronvalda bulvaris 1, Riga; ), which includes solutions for video shooting, audio recording, processing, live streaming and interactivity development.
- Biosignal (EEG) measurement system (ETHZF, Kronvalda bulvāris 1, Riga).
- Eye tracking measurement facility (ETHZF, Kronvalda bulvāris 1, Riga).
- Technology and IT support for monitoring knowledge perception.

As part of the IT support, students will have access to the RTU computer network (access via EDUROAM) with licensed office software and other software, including virtual laboratories available online, installed computer programs and data processing tools. Students will be provided with access to Moodle (part of RTU portal ORTUS) e-learning environment, Open-Edx, SAKAI, Open-OLAT, CANVAS, and TELECI e-learning environments and platforms for distance learning and face-to-face support of the learning process. Students will have access to a variety of applications in the computer classroom and on smart devices for learning.

### **Liepaja University Library**

LiepU library is a support for LiepU students and teaching staff members in the process of study and research. The library is a structural unit of LiepU, which provides the study process and scientific activities with information resources and services. Information about the Library is available in the Library section of the LiepU website (e.g. here: <https://www.liepu.lv/lv/202/kontaktinformacija-un-darba-laiki>). According to the LiepU Library Regulation, the objectives of its activity are to provide printed, electronic and other documents for the study process and scientific activities, as well as to be a cultural centre that promotes national and regional cultural values. The Library develops its collection and offers services in line with its objectives.

#### *LiepU library collection and database resources*

The collection of the library consists of approximately 65,800 items (94% monographic printed matter and other documents, 6% continuing editions). 75% of the entire collection is on open-access shelves, allowing teaching staff and students to choose the most appropriate issues.

The thematic relevance of the collection to the study programmes of the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" is as follows:

Students of the doctoral programme "E-Learning Technologies and Management" have access to literature on the following topics, e.g. e-learning technologies, knowledge society and its technologies, knowledge management, cyber security, personal development, educational psychology, research in education, higher education and university didactics, etc. Of all the information resources at the Library's disposal, approximately 1.8% of the items in the collection (printed items) are on these subjects. Given the specific nature of the topics, more attention has been paid to the availability of electronic books in subscription databases. For example, the EBSCO e-book collection contains some 18,603 titles under the following keywords: knowledge society technologies, knowledge management, data quality management, cyber security, e-learning technologies, pedagogy, higher education, educational psychology, personal development, management theory, educational research, etc.

If the Library does not have the necessary information resources, the services of the Interlibrary Loan (ILL) and the International Interlibrary Loan (ILL) are offered. Successful cooperation has been established with SUBITO, the document delivery service, the National Library of Latvia, etc. Latvian and foreign libraries. The total number of requests for domestic interlibrary loan (ILL) literature in 2021 was 24.

In the digital environment, the Library offers free use of databases for the needs of both students and teaching staff, organising access to subscribed, trial and open access databases on the LiepU computer network and beyond. Access to subscribed databases outside the LiepU computer network is provided in the LiepU e-library interface (available here: <https://e-biblioteka.liepu.lv/>). To access databases remotely, the user must use a VPN service. LiepU staff, teaching staff and students can install and configure the VPN service on their computers by following the instructions for setting up the VPN client on your computer (available here: <https://serviss.liepu.lv/vpn-klienta-iestatisana-datora/>).

Students and lecturers have at their disposal online databases which are subscribed to by LiepU, such as "Cambridge Journals Online", "EBSCO eBooks Academic Collection", "EBSCO Academic Complete", "Science Direct", "Scopus", "Web of Science", "Lursoft" special offer for students "Studenta komplekts", as well as "Mārketinga rokasgrāmata" and "Uzņēmuma vadītāja rokasgrāmata" by Letonika (extended with subscription to the Reading Room section) and Dienas Bizness. Everyone can also use the Library's open-access databases: Academic Staff Publications Database, Doctoral Theses Database and Final Theses Database. For the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science", databases such as EBSCO, as mentioned above, offer information resources on various topics of the courses taught in the study programmes. The library provides training, information and consultations on the use of information resources and services. In 2021, 25,827 information resource usage sessions were recorded in the databases subscribed to by the library.

#### *LiepU Library infrastructure and services*

The Library is open 55 hours a week (weekdays from 08.00 to 18.00 or 19.00, Saturdays from 11.00 to 16.00), unless restricted by the Covid-19 pandemic. During the pandemic, the Library's opening hours are reduced to 45 hours per week (weekdays from 08.00 to 17.00). The recorded visits to the Library on-campus in 2021 was on average 25 users per day (compared to an average of 150 users per day in 2019 (without pandemic restrictions)).

Users have at their disposal a service desk (for issuing and receiving information resources), a copy room (for copying, printing, scanning and binding), a group discussion room (on request), as well as 96 independent workstations for study and research in the reading room and library lobby, 16 computer workstations with Internet access in the electronic resources reading room (the number of workstations in the Library is reduced in case of epidemiological safety restrictions imposed by

the Covid-19 pandemic).

During library opening hours, users can use the *Self-Check* facility or contact the librarian on duty to check out or return books. Outside the library opening hours, books can be deposited in the *Book-dropbox* in the LiepU lobby. Free Wi-Fi is available throughout the Library. Since 2011, an RFID security system has been used to identify and protect the library's information resources.

In addition to the issue and receipt of information resources at the service desk, as well as the electronic ordering, reservation, renewal of use in the e-catalogue and use of reading rooms, the Library offers such services as on-site, e-mail or telephone inquiries and consultations on the use of information resources and services, in-person or remote (MS Teams) training sessions for Library users, use of the Library's subscription, trial access and open-access databases. The digitisation service (on-demand scanning) has been particularly developed during the Covid-19 pandemic.

For 30 years (since 1992), the Library's activities have been automated. Library information system ALISE automates library processes such as bibliographic data processing, collection, reader registration, issuing/receiving, ordering/reserving, remote access webPAC, mobile webPAC, etc. LiepU Library electronic catalogue (<https://alise.liepu.lv/>) and the University and Special Libraries Shared Catalogue (<https://alise.liepu.lv/Alise/lv/federatedsearch.aspx>) are available remotely - both on computers and mobile devices. The library's electronic catalogue provides a unified search of bibliographic information both about the collection and in the local databases created by the library. Remote access allows users to log in to My Library from anywhere and keep track of book issues, due dates, request extensions, and reserve or queue for the literature they need. In 2021, the Library's electronic catalogue registered approximately 116 000 information search requests.

The most up-to-date information about library services and opening hours can be found in the Library section of the LiepU website (<https://www.liepu.lv/lv/202/kontaktinformacija-un-darba-laiki>), and about information resources - in the LiepU Library monthly newsletter "Lasonis" (<https://www.liepu.lv/lv/223/jauniegvumi>). LiepU Library also presents the latest news on its social network profiles (Facebook, Twitter).

#### *LiepU Procedures for library collection replenishment and database subscription*

The library collection is replenished according to the needs of study programmes, in cooperation with teaching staff and students. Teaching staff fill in the "Request to LiepU Library Collection and Processing Department for collection" in accordance with LiepU quality management procedure "A-10-II Library collection". Any member of staff (appointed or visiting) may complete and submit a request with recommendations for the purchase of information resources. Students can submit recommendations for information resources by filling out the form on the LiepU website - in the Library Collection section (available here: <https://www.liepu.lv/lv/1340/studenta-ieteikums-gramatas-iegadei>) or in the Student Application Forms section (available here <https://www.liepu.lv/lv/3674/iesniegumu-veidlapas>). Applications are considered in accordance with the Library's Collection Policy.

The decision to subscribe to a particular database is made in several stages. First, data analysis is carried out: 1) usage statistics for free trial databases; 2) usage statistics for subscribed databases over several years. Attention is also paid to the recommendations of teaching staff. Secondly, the possible changes in the database offer are discussed in the Library Council (8 members), which represents LiepU administration, teaching staff, students and library staff. Thirdly, database subscription is being discussed with the Director of Finance and Human Resources, as well as the Vice-Rector for Science and Studies. The opinions are summarised and a decision is taken.

### **RTU Information Support and Library**

Students will have access rights to the ORTUS portal, which contains all the information necessary for the study process, including normative documents, lecture lists, contact information of academic and support staff, and news about the study process. Students will be assigned RTU e-mail addresses, which will be used to communicate with the academic and support staff of the respective university, as well as to receive up-to-date information.

The RTU portal (ORTUS) will provide links to modern e-learning platforms and environments, which will be used for the revision of the programme courses. Docents will introduce them to students at the start of the course. MOODLE, SAKAI, Open-Edx, Open-OLAT, CANVAS and TELECI e-learning environments under e-Big3 technology, which include mobile, stationary and public broadcasting, will be available for uploading independent work, studying lecture recordings and for practice assignments.

The documents (regulations, policies, procedures) required by the student will be available to the student throughout the study period and will be collected and maintained on the RTU portal ORTUS.

Students, academic staff and researchers will have access to the RTU Scientific Library, which is equipped with modern facilities and technologies and provides a variety of services:

- books, journals, databases and other electronic resources
- 24/7 remote access to electronic resources;
- 24-hour reading room, which is accessible to students with an RTU student ID card;
- the shared electronic catalogue of major university libraries;
- PRIMO, the unified search tool (searches the catalogue and subscribed databases at the same time);
- SBA - inter-library loan;
- information literacy lectures, classes, tutorials, trainings, etc.

The Library's information resource collection includes approximately 3,000,000 items in various languages, including:

- books and book collections;
- periodicals;
- reference literature;
- a collection of audiovisual material;
- electronic databases (SCOPUS, Web of Science, EBSCO)

The library provides trials of new databases. Every year RTU subscribes to the most important databases of scientific articles according to the needs of the faculties. According to the objectives of the study programme, students have access to electronic databases such as SCOPUS, Web of Science, EBSCO.

To update the content of the study literature, the teaching staff of the Distance Learning Study Centre develop and update teaching aids. The information repositories of RTU and ETHZF are at the disposal of the students:

- RTU Scientific Library book and periodical materials repository,
- Resources of the Faculty of e-Learning Technologies and Humanities,
- Resources and literature of the departments involved in the implementation of the programme.

Open technologies and open learning resources will be used during the implementation of the study programme, creating a broad knowledge base in the field of e-learning technologies and promoting the development of distance learning. The implementation of the study programme will allow to integrate the results of researches in the field of e-learning technologies, which have been

developed at RTU and in the world during the last 20 years, into the information support of RTU.

### **Methodological support at RTU and LiepU**

At the beginning of the study course, students will be familiarised with the course of study, the requirements for the study course and the prior knowledge necessary for its acquisition, as well as with the planning of study work in each study course and the methods and criteria for assessing the student's knowledge. Study materials, including the course description and the requirements for the course of study, will be made available to the student throughout the course of study.

Methodologically, the programme is based on the concept of student-centred education: the individual needs of the student are taken into account. The learning outcomes are formulated for the programme as a whole and for each individual course of study. Study credit points are linked to study outcomes. The sum of the individual course outcomes constitutes the learning outcomes of the programme. The achievement of learning outcomes as a process, and the learning outcomes themselves, is a central issue in the periodic internal evaluation - audit - of the study programme. As a result, students know and understand the intended learning outcomes.

The criteria for assessing and marking student performance are based on the learning outcomes assessed by the mark, showing whether and to what extent the learning outcomes have been achieved.

The methodological concept of the study programme provides for a very diverse use of study technologies and a very wide variety in the study process. This approach offers the possibility of achieving results through different pathways, including lifelong learning. Knowing the learning outcomes to be achieved leads to a better understanding for students, employers and society at large at international level - across education systems. Dialogue between all parties becomes possible.

The study process at Liepaja University is regulated by the Academic Integrity Policy ([https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/LiepU%20Akademiska%20godiguma%20kodekss\\_eng.pdf](https://www.liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/LiepU%20Akademiska%20godiguma%20kodekss_eng.pdf)).

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

The study and research base is developed at international level. RTU and LiepU have access to almost all the latest technologies with potential for e-learning research and development within the framework of international projects.

In cooperation with TRU, doctoral students are provided with study courses and teaching staff in the fields of engineering sciences.

The members of the Doctoral Council include representatives from the University of Latvia, Daugavpils University and RTU.

We are organizing joint doctoral schools in cooperation with the Daugavpils University, Vidzeme University of Applied Sciences, Rezekne Academy of Technology and RTU.

To ensure the advanced research development in the fields of data analytics and dynamic modeling we have designed joined Horizon Europe Programme project TED4LAT. This project will

strongly upgrade data analytics and dynamic modelling research in doctoral programme. We are cooperating with Vidzeme University of Applied Sciences, RTU, University Politecnico di Torino, Institut National de Recherche Pour L'Agriculture, L'Alimentation et L'Environnement (INRAE).

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

The funding of studies from the state budget is allocated each calendar year in accordance with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists.

The calculation of the projected costs of the doctoral study programme "E-learning technologies and management" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 3.0 The cost per study place in 2022 is EUR 10 095.30.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 4,100 (in English - EUR 4,200) and it is fixed for the whole study period, the total tuition fee for 4 years is EUR 16,400 (in English - EUR 16,800). Minimum number of students per course for full-time study: 5 students.

Since 2012, in the budget of Liepaja University of Applied Sciences there has been established a budget for the development and implementation of study programmes. The budget is planned and used for organising students' learning processes outside the university, for upgrading the material and technical base of the programmes (including laboratories), for recruiting qualified staff, etc.

A faculty science budget has been established to support the research (creative) activities of academic staff. The budget is planned and used for conference fees, travel expenses, organisation of scientific and methodological seminars, development of international cooperation, attraction of guest speakers, etc.

Liepaja City Municipality funding is available for attracting academic staff to ensure the quality of studies.

The use of DIF funding is regularly reviewed at meetings of the Faculty Council and the teaching staff, and at meetings of the Senate Budget and Development Committee.

LiepU has established quality management system procedures that support the study process - personnel management, financial management, IT, library and economic resources management, document management, project management, information circulation and public information management, as well as scientific and research management processes. For example, A-2-1 "Basic

### 3.4. Teaching Staff

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

The study programme is implemented by the teaching staff of RTU, LiepU and VIA. To ensure that doctoral students have a broad enough range of research, the study programme includes a relatively large number of academic staff. The qualifications of the teaching staff meet the conditions for the implementation of the study programme and the requirements of the regulatory enactments. **Teaching staff hold a doctor's degree, the position of a professor, associate professor, docent, lecturer, senior researcher or researcher.** The table below shows the date until which the teaching staff members are experts of the Scientific Council.

The teaching staff members involved and the corresponding courses of study are given in the table below:

Study course	Teaching staff	Scientific degree	Position	Latvian Council of Science (LZP) expert	Field of science
E-learning technologies E-learning content technologies Scientific work	Atis Kapenieks (RTU)	Dr.phys.	Associate professor	25.05.2023	Engineering & technology-Electrical engineering, electronics, information and communication technologies
E-learning technologies E-learning data research and analytics Scientific work	Jānis Kapenieks (RTU)	Dr.paed.	Senior researcher	30.06.2024.	Engineering & technology-Electrical engineering, electronics, information and communication technologies

E-learning technologies Scientific work	Lāsma Ulmane-Ozoliņa (LiepU)	Dr.paed.	docent		
E-learning data research and analytics Scientific work	Sarma Cakula (ViA)	Dr.paed.	professor	31.03.2024	Engineering & technology-Electrical engineering, electronics, information and communication technologies
E-learning data research and analytics	Ieva Vītoliņa (RTU)	PhD.	researcher		
Cyber security and e-learning technologies	Valdis Vītoliņš	Dr. comp.	Guest lecturer		
Current topics in knowledge management	Mārīte Kirikova (RTU)	Dr.sc.ing.	professor	06.04.2025	Engineering & technology-Electrical engineering, electronics, information and communication technologies
Data quality: methods, tools and techniques Scientific work	Anita Jansone (LiepU)	Dr. comp.	professor	31.03.2024 24.03.2023	1. Engineering & technology-Electrical engineering, electronics, information and communication technologies 2. Natural sciences-Computer and information sciences
Pedagogical strategies for personal socialisation Ideas Lab: pedagogical solutions for personal socialisation/	Lāsma Latsone (LiepU)	PhD in Social Sciences	researcher	04.05.2025	Social sciences-Educational sciences
Management theory	Iveta Cīrule (LiepU)	Dr.sc.administr.	assoc. prof.		

Transformative education for personal fulfilment Ideas Lab: pedagogical solutions in the context of Transformative Education	Linda Pavitola (LiepU)	Dr. paed.	professor	06.04.2025.	Social sciences- Educational sciences
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There are 16 lecturers involved in the implementation of the program. Of these, 8 (50%) are elected in LiepU.

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

In 2013, 5 teaching staff members were involved in the doctoral study process: 3 professors, 1 senior researcher, 1 researcher. Average age of staff - 60.8 years In 2022, 8 teaching staff members were also involved in the doctoral study process: 3 professors, 3 associate professors, 2 senior researchers. Average age of staff - 60.3 years There was staff renewal.

During the reporting period, the staff was generally renewed and actively involved in scientific activities, leading and implementing scientific projects related to the development of modern e-learning technologies. The projects sought new e-learning technology solutions. In the previous period, the most notable results were the creation of interactive television technology (EU FP6 project ELU/Enhanced Learning Unlimited), the creation of multiscreen eLearning technologies (eBig3 and ETM projects), and the organisation of large-scale teacher training. During this period we received the "BOLDIC 2013 Award for eBig3 - Best E-Learning Innovation in Scandinavia and the Baltic in 2013". We also received the Riga Innovation Award in 2009.

After 2013, the most prominent research areas are related to data analysis, learning analytics and the organisation of large-scale teacher training courses in areas related to modern technologies. We developed a new technology for monitoring and visualising perceptions of knowledge. For our work of the last decade "Interdisciplinary research on how to transform traditional e-learning technology into a real learning ecosystem of the Digital Age", we received the Latvian Academy of Sciences' Certificate of Recognition in 2022.

In order to ensure further research development, the Horizon Europe project "Twinning in Environmental Data and Dynamical Systems Modelling for Latvia / TED4LAT" was prepared in 2021. The project has been rated highly (14 out of 15 points) by EC experts and has been nominated for funding. Within the project, LiepU and RTU lecturers and doctoral students will learn new data processing and dynamic modelling methods. The TED4LAT project will provide an opportunity to attract doctoral students, new lecturers and to upgrade the E-learning technologies research strand for the future development of the programme.

In the new reporting period, 16 teaching staff will be involved in the doctoral studies: 6 professors (LiepU 4, RTU 1, ViA 1), 3 associate professors (LiepU 2, RTU 1), 4 senior researchers (RTU 4), 1 docent (LiepU), 1 lecturer (LiepU) and 1 guest lecturer. Average age of staff - 60.3 years There was

staff renewal.

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

The list of LiepU publications by LiepU teaching staff published in journals indexed in Scopus or WoS CC databases in the reporting period (2012-2022) is given below.

Information on the teaching staff members included in the Latvian Science Council's expert database is given in Section 3.4.1.

Publications by teaching staff members and year:

#### **2012**

##### **Lāsma Ulmane-Ozoliņa**

Possibilities of Computer-supported Collaborative Learning in Blended-learning

##### **Alīda Samuseviča**

The Cooperation in Reduction of the Social Exclusion of Youth

##### **Sarma Cakula**

Structurization of information for group work in an online environment

##### **Dagnija Deimante**

Systemic Approach to the Development of Independent English Study Skills in Upper-Secondary School

#### **2013**

##### **Anita Jansone**

An approach to information technologies for solving mathematical physics problems

##### **Sarma Cakula**

- Virtual Business Support Infrastructure for Entrepreneurs
- Development of a personalized e-learning model using methods of ontology
- Information Flow Modelling And Work Based Learning For Entrepreneurs In Online Environment
- E-learning developing using ontological engineering

##### **Blāzma Vikmane**

Socialisation In The Family And Formation Of Preschool Children's Concept Of Parent's Image

#### **2014**

##### **Lāsma Ulmane-Ozoliņa**

Importance of Collaboration Supported Context in Blended Learning

### **Alīda Samuseviča**

- The Development Of Information Communication Technology Competencies To Ensure Competitiveness Of Teachers
- Interaction Of Teacher's Professional Development And The School Environment: Practice And Possible Solutions
- Sources of Pedagogical Experience in the Study Process
- Empiric dimension of educational quality at preschool

### **Linda Pavītola**

Interaction Between Families Of Children With Special Needs And Support System: Parental Perspective

### **Sarma Cakula**

- Automated Learning Support System to Provide Sustainable Cooperation between Adult Education Institutions and Enterprises
- Modelling potential foreign applicant flow: Case of Vidzeme University of Applied Sciences
- Customized work based learning support system for less academically prepared adults in online environment
- Virtual business support infrastructure for entrepreneurs

### **Inese Lūsēna-Ezera**

Quality Assurance In Management Studies: Case Study In Liepaja University (Latvia)

### **Dagnija Deimante**

Attitudes to Ageing and Perceptions of Working with Older People of Students of Health and Social Care

## **2015**

### **Anita Jansone**

- Using High Performance Computing and Open Source Technologies for Solving Behaviour Analytics Problems in e-Learning
- Team Work Development Across the Curriculum for Information Technology Students at Liepaja University: Processes, Outcomes and Lessons Learned
- Use of High Performance Computing Technologies and Script Run Mediator Middleware for Educational Process in Liepaja University
- Multi factor authentication as a necessary solution in the fight with information technology security threats

### **Lāsma Ulmane-Ozoliņa**

User behavior in multi-screen eLearning

### **Alīda Samuseviča**

Civic Education For Lower Secondary Students

### **Sarma Cakula**

- Lifelong Learning Strategy Framework for the Vidzeme Region
- Digital opportunities for student's motivational enhancement
- Automated learning support system for adult education institutions and enterprises
- Applied E-studies and Traditional Studies to Rise the Motivation of 1-st Year University Students

### **Inese Lūsēna-Ezera**

Adaption Of New Teachers In Educational Establishments Of Liepaja City (Latvia)

### **Dagnija Deimante**

**2016**

**Anita Jansone**

- Learningapps.org E-Environment as a Tool of Blended Learning Form of Education at Elementary School
- Optimization of University Campus Wireless Network
- Alīda Samuseviča
- Motivation of Future Health Care Specialists in Promoting Social Wellbeing of Elderly People
- Practical Aspects of the Formation of Youth Civil Position in the Pedagogical Process
- The Development of Necessary Skills for Socially Responsible Learning Process Through Debating
- Values and Future Challenges of Children's Socialization in the Family
- Pedagogical - Psychological Regularities of Civic Education and Civic Engagement
- Pedagogical Ethics In The Study Process Of Future Teachers

**Linda Pavītola**

- Promoting Diversity Competence Development in Professional Profile of Teachers
- Teacher's Personal Competence Manifestations In The Context Of Inclusive Environment: Pilot Study

**Sarma Cakula**

- Actual demands based knowledge intensive technological model for lifelong learning development in Vidzeme Region
- Self-discipline as a key indicator to improve learning outcomes in e-learning environment
- Lifelong Learning Management System In Vidzeme Region
- Digital opportunities for 1st year university students' educational support and motivational enhancement
- Modelling of knowledge sharing processes for the provision of trilateral cooperation

**Blāzma Vikmane**

Values and Future Challenges of Children's Socialization in the Family

**Ilze Miķelsone**

- Understanding participation in early childhood education: Case study
- Outdoor sports recreation to improve the well-being of 45-55-year-old people
- Meaningful Interaction between Childrens and Teacher in Pre-School Education Practice
- Future teachers' reflection to understand their professional identity
- Male Teachers' Well-Being in the Context of Professional Identity

**Irina Strazdiņa**

Role Of Purposefulness In The Development Process Of Personality

**Inese Lūsēna-Ezera**

- From industrial city to the creative city: development policy challenges and Liepaja case
- Migration Of Labour In The Baltic States: Economic Impact And Consequences
- Performance Trends In Youth Entrepreneur's Capacity Prerequisite For The Entrepreneurship Development In Latvia
- The transformation of traditional universities into entrepreneurial universities to ensure sustainable higher education

**Dagnija Deimante**

Measuring students perceptions and validation of questionnaires

**2017**

**Anita Jansone**

- Recommended formatting parameters for e-study materiāls
- Gold - section in interactive user interface development
- Research of guidelines for designing E-study materiāls

**Lāsma Ulmane-Ozoliņa**

Digital competence and blended learning

**Alīda Samuseviča**

- The Perspective Of Responsibility Formation: Challenges And Oppurtunities
- Values Education For Sustainable Development
- The sustainable pedagogical approach for resolution of problems in pre-school education
- The Factor if Social Affiliation of Youth in Promoting Citizenship
- The Development of Teachers' Pedagogical Competence in The Process of Self-Education at The University
- Student's Gains Of Debating In The Productive Learning Process
- Trends of Child's Upbringing Difficulties in Family and Pre-school

**Linda Pavītola**

- Promoting Diversity Competence Development in Professional Profile of Teachers
- Teacher's Personal Competence Manifestations In The Context Of Inclusive Environment: Pilot Study

**Sarma Cakula**

- Simulation Modelling for School Development in Adazi Municipality
- Modelling of Knowledge Sharing for the Provision of Sustainable Cooperation between Adult Educational Institutions and Enterprises
- Solving the problems of linguistically diverse the 1st year university student's using digital learning
- Technological solution for developing sustainable cooperation between adult education institutions and enterprises

**Blāzma Vikmane**

- Trends of Child's Upbringing Difficulties in Family and Pre-school
- The sustainable pedagogical approach for resolution of problems in pre-school education

**Ilze Miķelsone**

- Challenges and Solutions for Preschool Teachers in Their Educational Practice
- How Novice Teachers of Different Education Backgrounds Perceive Their Professional Identity

**Irina Strazdiņa**

- Pedagogical and Psychological Aspects of Parent Education Content in Children's Upbringing
- Promotion Oppurtunities Of Student's Competitiveness During Study Process
- Socio-Psychological Aspect Of Crisis Intervention In Social Work Practice

**Inese Lūsēna-Ezera**

Labour Market Trends And Occupational Interest Of Youth In Latvia

**2018**

### **Anita Jansone**

- Digital Devices Use for Educational Reasons and Related Vision Problems
- Habits of Using Internet and Digital Devices in Education
- Students' Attitudes Toward Learning Activities Organized with the Means of WebQuest Method
- Processed seaweed and winemaking waste co-fermentation for biogas extraction: Pilot study

### **Alīda Samuseviča**

- Reflection about Teachers' Professional Development Facilitation
- Values Highlighting Productive Learning in the Process of Debating
- Characteristics Of Youth Civic Engagement In Liepaja City

### **Linda Pavītola**

Pedagogical Relationships as an Aspect of Music Teachers' Professional Competence

### **Sarma Cakula**

Smart technological learning conceptual model

### **Ilze Miķelsone**

- Perspectives for Perfecting the Pedagogical Activity of Pre-School Teachers for Implementation of a Child-Centred Learning Approach
- Summer Universities in the Context of Higher Education Internationalization
- Goal Setting Skills in Teachers' Professional Development

### **Inese Lūsēna-Ezera**

- The presence of violence at work of health care personnel and their work ability
- Comparative analysis of career choices by students in Latvia and the UK
- Innovative start-ups: challenges and development opportunities in Latvia
- Teamwork In Manufacturing Enterprise Performance Achievement
- Necessity of work team in manufacturing branch start-up enterprises in Latvia
- Analysis of eco-innovation trends and development opportunities in Latvia
- Water resources for medical tourism development in Latvia

## **2019**

### **Anita Jansone**

- Study Process Visualization in Moodle
- Benefits from Analyzing Video Lecture Logs with Leading Business Analytics Tools
- The Prototype Version for e-Material Creating and Formatting Application
- Technology enhanced learning in teachers' professional development
- E-material Creating and Formatting Application
- The prototype version for e-material creating and formatting application
- Benefits from analyzing video lecture logs with leading business analytics tools
- The concept for e-material creating and formatting application prototype
- E-studies and mastering of educational material for people with visual perception and visual - motor integration problems - topical issues and perspectives
- Artificial intelligence aspects in developed e-material formatting application

### **Lāsma Ulmane-Ozoliņa**

- Study Process Visualization in Moodle

- Technology enhanced learning in teachers' professional development

### **Linda Pavītola**

- Self-Actualization Opportunities For Immigrants In The Context Of Diversity
- Interconnections Between Teacher's Attitude And Inclusive Education

### **Sarma Cakula**

- Technology-Based Communication in the Business Company
- Adults' digital competence and readiness for online learning: Preliminary findings on latvian adult learners' readiness to study online
- Adults' readiness for online learning in the Czech Republic and Latvia (digital competence as a result of ICT education policy and information society development strategy)
- Measuring teachers-as-learners' digital skills and readiness to study online for successful e-learning experience
- Future Generation Education Technological Model

### **Inese Lūsēna-Ezera**

- Emphasis of the Teamwork in Manufacturing Start-up Enterprises
- Challenges of the 21st Century: Hands-on Learning for Improving STEM Education
- European bioeconomy policy and new opportunities for bio-based business development

## **2020**

### **Anita Jansone**

- The Initial Stage of Development of a New Computer Program for the Processing of Psychophysiological Tests
- Usability Evaluation of Business Process Modelling Tools through Software Quality Metrics
- E-material Formatting Application Prototype 2.0 Development Through Usability Testing of Prototype 1.0
- E-material Formatting Application Prototype 2.0
- Use of Artificial Intelligence and Machine Learning for Personalization Improvement in Developed e-Material Formatting Application

### **Alīda Samuseviča**

The Russian language in Latvia The historic linguistic situation

### **Sarma Cakula**

- Dynamic System Sustainability Simulation Modelling
- The Impact of Using Technology-Based Communication on Quality of Work Relationships
- Input Determination for Models Used in Predicting Student Performance
- The Impact Of Information And Communication Technologies (ITC) On Employees' Motivation
- Development of an Effective and Secure Communication System in a Quarantine Situation

## **2021**

### **Anita Jansone**

- Multi-layered Higher Education E-Learning Framework
- Usability evaluation of business process modelling tools through software quality metrics
- Vimot-development of visual-motor tests methodology including the adoption of uniform rules and digital test development

### **Alīda Samuseviča**

Challenges In Education During Pandemic: Transformation Of Pupil And Teacher Interaction

### **Linda Pavītola**

- Action Research For Creating Networks In Pedagogical Practice
- The importance of teacher's attitude for multifaceted educational experience transfer to students' personal and professional development

### **Sarma Cakula**

- Predictive Data Analysis Model for Employee Satisfaction Using ML Algorithms
- Motivation in a Business Company Using Technology-Based Communication
- Use of AI for Improving Employee Motivation and Satisfaction
- Employee attrition estimation using random forest algorithm
- Communication technologies in a remote workplace
- Active Machine Learning in Regression Problems

### **Ilze Miķelsone**

Teacher's Identity Development Through M2Reflection

### **Inese Lūsēna-Ezera**

The Development of Digital Transformation and Relevant Competencies for Employees in the Context of the Impact of the COVID-19 Pandemic in Latvia

### **2022.gads**

### **Ilze Miķelsone**

Pre-school Teachers' professional development needs concerning competency-based teaching

### **Anita Jansone**

Current Perspectives in Social Media Supported E-Learning

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

In May 2022, a new HorizonEurope project "TED4LAT Twinning in Environmental Data and Dynamical Systems Modelling for Latvia" was approved, in which the teaching staff members involved in the doctoral programme plan to participate. The share of funding of RTU is 1.2 million EUR, the share of funding of the Liepaja University is EUR 0.4 million. EUR.

### **Involvement of LiepU academic staff in research projects:**

### **Anita Jansone**

2021-2024. FLPP, Afektīvas un traucētas balss stimulu neirālā apstrāde kustību uzdevumu laikā: EEG pētījums" (Nr. Izp-2021/1-0159), projekta izpildītāja.

2020. VPP "Covid-19 seku mazināšana" , Projekts Nr.VPP-COVID-2020/1-0009 , ARTSS- Advanced Resilience Technologies for Secure Service. Projekta izpildītājs un vadītājs no partner augstskolas puses (vadošie RTU)

2020. Darbības programmas "Izaugsme un nodarbinātība" 1.2.1. specifiskā atbalsta mērķa "Palielināt privātā sektora investīcijas P&A" 1.2.1.2. pasākuma "Atbalsts tehnoloģiju pārneses sistēmas pilnveidošanai". Project Nr. KC-PI-2020/36. Pašattīrošo superhidrofobo un superhidrofilo nanopārklājumu izpēte un izstrāde fotoelektriskajiem pārveidotājiem un Saules siltuma kolektoriem. Projekta izpildītāja.

2018-2021.; 1.1.5/18/I/018 Pētniecības, inovāciju un starptautiskās sadarbības zinātnē veicināšana Liepājas Universitātē. Projekta izpildītāja.

2017-2020. Improving smart specialisation implementation of the Baltic Sea Region through orchestrating innovation hubs (SMART-UP BSR). Projekta izpildītāja

### **Lāsma Ulmane-Ozoliņa**

2020 Valsts pētījumu programma Nr. VPP-COVID-2020/1-0009 "Perspective technologies for sustainable and safe services", pētniece

### **Alīda Samuseviča**

2016 - 2017 Project within the Scope of Program Erasmus+ "MOKKA = MOdellentwicklung: Kunsts und Kreativital als Alternative (MOKKA=Model Development: Art and Creativity as Alternative)" with Westfalen-Kolleg Paderborn, Project Number: 2016-1DE02-KA204-003303

2011 - 2013 ESF Project "Development and Implementation of Support Programs for Creation of Support Systems for Young People Being at Risk of Social Exclusion", Leading Researcher, Expert

### **Pāvels Jurs**

22/10/2020 - ... vadošais pētnieks valsts pētījumu programmas projektā "Transformation of Educational Value for Cultural and Economic Growth of Social Community (IzVeTSKKEI)" projekta Nr. Izp-2020/1-0258.

01/09/2020 - 15/11/2020 pētnieks Liepājas Universitātes īstenotajā pētījumā (iepirkuma identifikācijas numurs: IZM 2020/21/AK/ESF) "Pētījums par priekšnosacījumiem sekmīgai pārejai no pirmsskolas izglītības uz sākumskolas izglītību" ESF projekta Nr.10.1.3.0/19/TP/002 "Atbalsts pētījumiem ES fondu 2021.-2027. gada plānošanas perioda ieguldījumu priekšnosacījumu izpildes nodrošināšanai izglītībā" ietvaros.

### **Iveta Cīrule**

2020.gada 2.janvāris - 2022.gada 30.jūnijs Projekts Cities2030 (<https://cities2030.eu/>) , programmas Apvārsnis, projekta vecākais eksperts un projektu vadītāja, 2021.gada 6.marts - 2022.gada 14.marts, īstenotājs - Rīgas Tehniskā universitāte Co-creating resilient and sustainable food systems towards FOOD2030: Cities2030, Nr 101000640

Projekts DIAL (<https://dialproject.eu/>) , programma Erasmus Plus, vadošais pētnieks, 2017.gada septembris - 2019.gada augusts, īstenotājs - biedrība "Project Net" Digital Aquisition Through Intergenerational Learning Nr. 2017-1-LV01-KA204-035455

Projekts FINE2WORK (<https://fine2work.eu/> ), programma Erasmus Plus, vadošais pētnieks, 2019.gada oktobris - 2021.gada septembris, īstenotājs - biedrība "Project Net" Promoting Financial, Digital and Entrepreneurial Competences For Vulnerable Adults (Women) With Restricted Access To The Digitalised Market (Home Based), Nr. 2019-1-LV01-KA204-060337

Projekts "Entrepreneurship Education and Integration for Third Parties citizens in Latvia", Latvian Language State Agency, Coordinator, 2015-2016, Nr IF/2013/1.a/2, European Social Fund, vadošais pētnieks

Estonia Latvia Cross Boarder Cooperation Project „ORGANIC JELLY CANDY WITH FREEZE DRIED BERRIES” Nr. EstLat 32, Ltd BIORGANIK5, Riga, Latvia, Veca Bikernieku Street 9-16, LV 1079, [www.biorganik.lv](http://www.biorganik.lv), 2017.gada maijs -2018 .gada oktobris , jauna produkta - dabīgās želejas konfektes ar aukstumā žāvētām ogām izstrāde, projektu vadītāja un inovāciju procesa vadītāja

### **Linda Pavītola**

01.01.2021. – 31.12. 2023. Pētniece Fundamentālo un lietišķo pētījumu projektā “Izglītības vērtības transformācija sociālās kopienas kultūras un ekonomiskajai izaugsmei”(IzVeTSKKEI) (projekta Nr. Izp-2020/1-0178).

07.-11.2020. Eksperte -- IZM pasūtījuma pētījumā “Pētījums par priekšnosacījumiem sekmīgai pārejai no pirmsskolas izglītības uz sākumskolas izglītību” (Nr. IZM 2020/21/AK/ESF), ESF projekta Nr.10.1.3.0/19/TP/002 “Atbalsts pētījumiem ES fondu 2021.-2027. gada plānošanas perioda ieguldījumu priekšnosacījumu izpildes nodrošināšanai izglītībā” ietvaros.

### **Lāsma Latsone**

No 01.01.2021. Projekta vadītāja LZP apstiprinātam projektam: “Izglītības vērtības transformācija sociālās kopienas kultūras un ekonomiskajai izaugsmei”, projekta Nr. Izp-2020/1-0178. Projekta ilgums – 3 gadi. Projekta sadarbības partneri – ViA un RTA

2020-2023 NordPlus NPAD-2021/10151 projekts: Daudzvalodu un multikulturāla mācību telpa senioru labizjūtai attālos reģionos pandēmijas krīzes laikā (MAMA)

09/2020 - 08/2023 NordPlus Horizontal 2020. Pre-Service Teacher Career Perspectives to Facilitate Sustainable Inclusive Education Reforms (PreTeCap) (NPHZ-2020/10090)

2013-2016: Pētnieku komandas locekle projektā: „Children’s Happiness and Meaning Making: Implications for Elementary Social Emotional Education and Academic Performance” (IRB Approval # 111206014, Projekta turētājs - Seattle Pacific University, ASV)

### **Dina Bethere**

VPP “Mūsdienu latviešu valodas izpēte un valodas tehnoloģiju attīstība” Nr. VPP-LETONIKA-2021/1-0006, 4. projekta virziena “Datos balstīta latviešu zīmju valodas izpēte” (2021 – 2024), vadošā pētniece

Iepirkuma pētījums (iepirkuma identifikācijas Nr.: IZM 2020/21/AK/ESF) “Pētījums par priekšnosacījumiem sekmīgai pārejai no pirmsskolas izglītības uz sākumskolas izglītību” ESF projekta Nr.10.1.3.0/19/TP/002 “Atbalsts pētījumiem ES fondu 2021.-2027. gada plānošanas perioda ieguldījumu priekšnosacījumu izpildes nodrošināšanai izglītībā” ietvaros, projekta vadītājs LiepU

VPP “ Latviešu valoda” (līguma Nr. VPP-IZM-2018/2-0002), projekta izpildītājs (2018.-2020.)

Valsts pētījumu programma „Inovatīvi risinājumi sociālajā telerehabilitācijā Latvijas skolās iekļaujošās izglītības kontekstā INOSOCTEREHI” ( līguma, Nr 10-4/VPP-8/7), projekta vadītāja Liepājas Universitātē, vadošā pētniece (2014.-2018.)

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

Cooperation between teaching staff is actively pursued at several levels, using different forms of cooperation as appropriate.

Study courses, teaching materials, the study programme, the development strategy and the sustainability plan are continuously updated, supplemented and improved. New courses are also created or added to take account of developments in the sector. At the time of submission of the self-assessment, there are 10 students and 4 degree candidates, of whom 1 has submitted the thesis to the Doctoral Council and one is in preparation for submission. In 2022, 8 key teaching staff members were involved in the doctoral study process: 3 professors, 3 associate professors, 2 senior researchers. Average age of staff - 60.3 years

Joint events are organised where faculty members become more familiar with the content and methods of the courses they teach to avoid duplication of content and to enable transdisciplinary collaboration in the course.

An important form of cooperation between the programme's staff is the preparation and implementation of joint international and national projects. In recent years, RTU, LIEPU, LU, RTA, VIA jointly implemented the project ARTSS of the COVID programme of the Latvian Academy of Sciences, within the framework of which extensive research and trials were carried out on the technology of knowledge perception monitoring.

As a result of successful cooperation between RTU, LiepU and ViA, HorizonEurope project "TED4LAT Twinning in Environmental Data and Dynamical Systems Modelling for Latvia" was jointly prepared. The project has been highly commended by the European Commission and has been put forward for funding. The project will train doctoral students and supervisors in advanced dynamic modelling techniques.

Together with strategic partner Coursera, the programme implementers have prepared a new project proposal for EduAim, which will enable the programme to become more internationally active.

# Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Diploma_sample_Doct_ENG.pdf	Diploma_Akadlzzina_paraugs_Dokt_E_stud_LV.pdf
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)	Nr_43_LiepU_dokt_e_studijas_250_EN.docx	AIP_Nr_43_LiepU_dokt_e_studijas_250.docx
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	APPENDIX_5_Statistical data on students in the study programme.docx	5_Pielikums_Statistika_E-studijas.docx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard		
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	P08_3.2.1_EStudijas_Kartejums_lv_Mapping_eng.docx	P08_3.2.1_EStudijas_Kartejums_lv_Mapping_eng.docx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	P09_3.2.1_EStudijas_TP_LiepU.docx	P09_3.2.1_EStudijas_TP_LiepU.docx
Descriptions of the study courses/ modules	Study_courses_E-learning_tehnologies_and_management.docx	Kursu_apraksti_E-stud_tehnoL_un_parvald_LV_v1.docx
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)	Apliecinajums_5Doktori_3LZP_ENG.edoc	Apliecinajums_5Doktori_3LZP_LV.edoc
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)	Apliecinajums_akad.person. 5profesori_ENG.edoc	Apliecinajums_akad.person. 5profesori_LV.edoc

# Information Technology (42484)

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
ProcedureStudyProgram.Name	<i>Information Technology</i>
Education classification code	<i>42484</i>
Type of the study programme	<i>Professional bachelor study programme</i>
Name of the study programme director	<i>Dzintars</i>
Surname of the study programme director	<i>Tomsons</i>
E-mail of the study programme director	<i>dzintars.tomsons@liepu.lv</i>
Title of the study programme director	<i>datorzinātņu maģistrs (Mg.sc.comp.)</i>
Phone of the study programme director	<i>29471460</i>
Goal of the study programme	<i>Preparation of highly qualified specialists in the information technology and telecommunications sector, providing opportunities to obtain appropriate second-level professional higher education and profession and developing competences that contribute to the development of a creative personality and a professional career on a regional and international scale.</i>
Tasks of the study programme	<ol style="list-style-type: none"> <li><i>1. Ensure the acquisition of knowledge that meets the requirements of the second-level higher professional education standard.</i></li> <li><i>2. Develop research competences and a creative approach necessary for solving various social, economic and technical problems using information technology.</i></li> <li><i>3. Promote the self-education needs satisfaction and involvement in further education.</i></li> <li><i>4. Ensure the acquisition and development of skills and abilities necessary for performing professional duties in software engineering in accordance with the requirements of the professional standard.</i></li> <li><i>5. Develop the social and communicative competences necessary for teamwork, both on-site and off-site, in domestic and international software development projects.</i></li> </ol>

Results of the study programme	<p>1. The general skills have been acquired which are necessary to be able manage teamwork, plan the work, present the IT solutions and the results of the work done in Latvian and English.</p> <p>2. The common knowledge of the information technology industry on the design of computer systems and the basic principles for building them, IT applications for natural, technical, and social process solutions, national and international standards of the IT industry and IT industry terms in Latvian and English, as well as advanced skills for the use of acquired knowledge in practice, has been acquired.</p> <p>3. Methods and technologies for programming, development and maintenance of computer systems have been learned.</p> <p>4. The skills needed to carry out independent research in the information technology sector have been acquired and developed.</p> <p>5. Special skills have been acquired and developed in the profession of programming engineer required to perform professional duties - coding, design, software maintenance, software deployment, software testing, specification of requirements, preparation of user documentation and software project planning.</p>
Final examination upon the completion of the study programme	Bachelor Thesis (12 creditpoints or 18 ECTS)

## Study programme forms

### Full time studies - 4 years - latvian

Study type and form	Full time studies
Duration in full years	4
Duration in month	0
Language	latvian
Amount (CP)	160
Admission requirements (in English)	Secondary education
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Professional Bachelor degree in Information Technology
Qualification to be obtained (in english)	Software engineer

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

### Full time studies - 4 years - english

Study type and form	Full time studies
Duration in full years	4
Duration in month	0
Language	english
Amount (CP)	162
Admission requirements (in English)	Secondary education and a minimum level of B2 in English

Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional Bachelor degree in Information Technology</i>
Qualification to be obtained (in english)	<i>Software engineer</i>

### **Places of implementation**

<b>Place name</b>	<b>City</b>	<b>Address</b>
University of Liepāja	LIEPĀJA	LIELĀ IELA 14, LIEPĀJA, LV-3401

## 3.1. Indicators Describing the Study Programme

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

There have been no structural changes to the study programme during the previous reporting period. Its aims, objectives and structure have remained. In response to the rapidly changing situation in the IT industry and the field of technology, the content of several study courses has been updated (e.g. "Computer Graphics and Animation", "Algorithms and Data Structures", "Software Development Project Management", "Current Issues in Software Engineering", etc.), some study courses have been replaced by others whose content is more relevant to the IT sector requirements and current technology trends (see Table 3.1.1.1).

A significant change in the study program is the change of its code determined by the adoption of Cabinet of Ministers Regulation No. 322 "Regulations on the Classification of Latvian Education" (on 13.06.2017). According to it, the group educational programs "481-Computer Science" has been deleted from the classification of Latvian educational sectors. Therefore, the group of educational programs "484 - Programming" has been determined as the most suitable for the study program for the new accreditation period and the new code of the study program is set to 42484.

**Table 3.1.1.1. Courses included in the study programme after the accreditation letter was issued**

Previous study course	New study course	Course scope	Time period
Non-linear computer video montage	Internet of Things	2	2nd sem.
IT industry laws and standards	Introduction to data processing systems	2	2nd sem.
Multimedia systems	Applications of artificial intelligence	2	3rd sem.
Probability theory and mathematical statistics II	Data processing systems	2	4th sem.
Software quality and testing	Software testing	2	4th sem.
Database technology II	Software and data quality	2	4th sem.
Physics (scope reduced from 4 CP to 2 CP)	Mobile apps	2	5th sem.

The development and inclusion of the courses "Internet of Things", "Applications of artificial intelligence" and "Data processing systems" in the study programme was determined by the global trends in technology development, the requirements of the university partners - representatives of IT companies, as well as by the smart specialisation direction and sub-directions defined by the DIF and DITI. The content of the course "Introduction to data processing" meets the requirements of the programme development. Firstly, the course teaches students the basics of the Python programming language, which is required for the study courses "Internet of Things", "Applications of artificial intelligence" and "Data processing systems", as well as extending their knowledge and skills in the implementation of their projects. Secondly, the fundamentals of database design and SQL learned in the course "Introduction to data processing" enable students to develop more complex study projects (within the course "Study project (Software development)") as early as the end of the first year.

Major changes have been made to the study programme in preparation for re-accreditation. The study programme includes several study modules (see Table 3.1.1.2), each of 10 credit points. Each study module ends with the presentation and/or defence of a study project. The individual courses within the module are to be implemented in a compact sequence. This allows students to focus on a specific content and to take several courses consecutively in one semester.

**Table 3.1.1.2. Study modules**

Software development I	1st sem.
Software development II	2nd sem.
Software engineering I	3rd sem.
Software engineering II	4th sem.
Computer systems and networks	5th sem.
Applications of artificial intelligence*	5th or 7th sem.
Smart technologies *	5th or 7th sem.
Advanced course of the School of Computing *	5th or 7th sem.
Exchange semester at a partner university abroad *	5th or 7th sem.
Software engineering III	6th sem.

In the 5th and 7th semester, students can choose modules on "Applications of artificial intelligence", "Smart technologies", "Advanced course of the School of Computing" and "Exchange semester at a partner university abroad" (one per semester). The module "Advanced course of the School of Computing" is recommended for students who wish to work as a teacher of computing in a school after their Bachelor's degree (after one year of study in the second-level higher professional education programme "Teacher" or after completing a 72-hour professional education

course for teachers). The module "Exchange semester at a partner university abroad" provides the student with the opportunity to go to a LiepU partner university of his/her choice under the Erasmus+ or other student exchange programme, and up to 10 CP (or 15 ECTS) of successfully completed study courses that have not been previously completed at LiepU are transferred. This reduces the burden of academic debt that a student may incur after returning from an exchange.

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

The scope of the study programme is 160 credit points or 240 ECTS; the study duration is 4 years, which is in compliance with the Cabinet of Ministers' Regulations on the State Standard of Second Level Professional Higher Education (No 512; from 26.08.2014) The first two years provide the fundamentals of software engineering. After the second year of study, students are able to fully perform the duties of a programmer and tester in software projects. In the third and fourth year, students study (a) advanced software engineering courses, which provide competences of a software engineer, and (b) specialisation courses - artificial intelligence applications, smart technologies and specialisations offered by LiepU partner universities, (c) go on internships in IT companies and (d) develop a bachelor thesis.

After completing the study programme, students obtain a professional bachelor's degree in information technology and a qualification as a software engineer. In addition to the knowledge and skills required for the direct performance of professional duties, the study programme also includes general education courses and mathematics, which develop students' abstract and critical thinking skills necessary for self-directed continuing education, career development, interdisciplinary project implementation and innovation. That's why the title of the study programme is chosen for the field in which the professional degree is awarded, which is broader than the title of the profession.

Study programme code - 42484

- Education level: Higher education (4 - first digit)
- Type of education programme: 2nd level higher professional education (5th level professional qualification and professional bachelor's degree); LQF - level 6 (42 - first and second digits);
- Education subject group: science, maths and information technology (4 - third digit)
- Subject area of education: computing (48 - third and fourth digits);
- Educational programme group: programming (484 - third, fourth and fifth digits)

The study program both by its title ("Information technology") and by qualification ("Software engineer") corresponds to the field of study "Information technologies, computer engineering, electronics, telecommunications, computer management and computer science". The aim and tasks of the study program are focused on the preparation of highly qualified information technology specialists. The knowledge of Mathematics is essential for a software engineer to analyze problems and find and implement their solutions. Thus, the assessment of mathematical knowledge is required in the student admission requirements. English knowledge and skills, which is also specified in the admission requirements, is necessary both for students' self-education during their

studies and also later after obtaining a diploma, as well as for building their own professional career (especially, in international IT project teams).

The study program is implemented in Latvian (national language) and in English. Studies in Latvian are provided for citizens of Latvia, and in English – for international students. In both language streams, the study program is implemented identically, except the course "Latvian language for international students" in the amount of 2 credit points (or 3 ECTS), which is an additional course for international students. Therefore, the amount of study program in Latvian is 160 credit points (240 ECTS), in English - 162 credit points (243 ECTS).

During the studies, students acquire knowledge and train skills for the profession of "Software engineer", the professional standard of which is in the process of being updated. On 15.09.2022, the Latvian Information and Communication Technologies Association (LIKTA) has developed the updated version of the professional standard and submitted it to the Ministry of Education and Science (IZM) for evaluation and approval.

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

The study programmes correspond to the STEM field (*Science, Technology, Engineering, and Mathematics*) and their development is prospective in terms of national development priorities[1] and is related to the implementation of the Strategy for smart specialisation[2]. The EM labour market analysis also shows that even with relatively high wages, it is already difficult to meet the growing demand for IT specialists - programmers. As a result, there is insufficient supply and high demand for IT specialists. This is because business models, methods and tools have changed significantly in recent years. The development of any industry requires large-scale IT services due to implementing a variety of digital solutions. This trend is also confirmed by the 2016 EM report "Labour Market Realignment for a Faster Growing Economy"[3], which predicts that the demand for science, mathematics and information technology specialists will increase in the future. Demand in this group is forecast to exceed supply by 126%.

Despite the relatively high supply of study programmes in Latvia, there is a shortage of at least 1000 IT specialists[4]; according to the Ministry of Economics, by 2020 there will be a shortage of more than 4200 IT specialists in Latvia. Unfortunately, according to the Tele2 SSC survey, only 12.7% of boys and 2.1% of girls pursue a career in IT[5].

The study programme is in line with Priority 3 of the Latvian strategy for smart specialisation "Increasing energy efficiency", Priority 4 "Development of a modern ICT system in the private and public sectors", Priority 6 "Developed knowledge base (basic science and scientific infrastructure) and human capital in knowledge areas". The Smart specialisation areas "Smart materials, technologies and engineering systems", "Smart energy" and "Information and communication technologies" correspond to these priorities. IT programmes train professionals to develop new products for modern and efficient public administration, e-services and digital content development, cross-border cooperation for the digital single market.

The development and activities of the programme are coordinated with the Kurzeme region sustainable development planning documents, as well as with the "Liepaja City Sustainable Development Strategy until 2030", which indicates Liepaja as an education, science and research centre, and emphasises the development of natural and engineering sciences in Liepaja.

The Ministry of Economy's "Informative Report on Medium- and Long-term Labour Market Projections"[6] notes that education policy has set a target to restructure state support for higher education studies in line with medium-term labour market projections. In 2020, the share of budget places in science and engineering (Natural Sciences, Mathematics and Information Technology thematic group and Engineering, Manufacturing and Construction thematic group) is expected to reach more than half or 55% of the total number of budget places (p.43). As well as proposals to improve labour market supply in higher education, it is pointed out (p.97) that the number of budget study places in engineering, information and communication technologies, pharmacy and agriculture should be further increased; the provision of universities with modern facilities, equipment and technologies in priority fields of study such as natural sciences, mathematics and information technologies, engineering, manufacturing and construction should be improved.

The study programme is designed to respond to the dynamic changes in the economic situation and the labour market regarding the need for ICT and engineering professionals. The results of labour market studies carried out in Latvia in recent years (Informative report of the Ministry of Economics on medium- and long-term labour market forecasts[7]) show the need and growing demand for ICT specialists. According to the Ministry of Economics' "Information Report on Medium and Long-term Labour Market Projections", even with relatively high wages, there are already difficulties in meeting the growing demand for IT specialists - programmers. As a result, there is insufficient supply and high demand for IT specialists. This is due to the fact that the business model has changed significantly in recent years. Any industry requires large-scale services from other industries, such as IT services.

The Latvian Information and Communication Technology Association (LIKTA) also states in its letter of support that "there is currently a catastrophic shortage of specialists in the information and communication technology sector. In addition, the training of skilled ICT professionals is a pressing problem not only in Latvia, but across Europe and, according to EU forecasts, by 2020 there will be a shortage of more than 900 000 ICT professionals in Europe in various sectors. "According to the Digital Agenda Scoreboard, 40% of companies in the EU are currently struggling to fill ICT vacancies. In Latvia, the number of ICT companies is growing every year, which shows that the need for new professionals will increase." IT degree programmes should therefore be supported and developed to train new professionals.

Employers' views on the study programme are reflected in the internship reports and indicate that all students are good at organising their work, are in good contact with company management and their colleagues, and have sufficient theoretical and practical knowledge. During traineeships, students learn new things, demonstrating their growth both in terms of knowledge and practical work. All students received only the grades "good", "very good", "excellent" or "outstanding" for their internship.

Representatives of IT companies Emergn Latvia, Accenture Latvia, SIA "Microsoft Latvia", Giraffe360, TestDevLab, Like A Coffee, DEVS.LV are organising guest lectures on topical computing topics. Liepāja University is a member of Latvian Information and Communication Technology Association (LIKTA), Electrical Engineering and Electronics Industry Association (LETERA), IT Cluster and Microsoft IT Academy Program.

Most of the graduates work in IT companies in Liepāja, for example, Emergn Latvija, Tieto Latvia, Giraffe360, TestDevLab, also in companies founded by LiepU IT graduates "IT Līderis", PROGoteam, HighFive.lv, etc. Many graduates work in IT companies outside Liepāja, such as Accenture, MikroTik, "Like A Coffee", etc. IT graduates mostly work in the industry. Some of the IT Master's graduates are also LiepU teaching staff members (Mārtiņš Sinka, Aija Lagzdiņa, Māris Gulbis).

When evaluating employers' feedback on students who have gone on internship during the

reporting period, employers positively evaluate students' abilities to perform their work duties - good communication skills, ability to plan the work to be done, good theoretical knowledge and skills to apply it to tasks, such as software development using PHP, JavaScript, HTML, SQL. In several questionnaires, employers have expressed their wish for students to continue their education and further develop themselves professionally. Some questionnaires also made specific recommendations, such as learning new programming languages (e.g. Python, Java), improving skills in automated test development, advanced data processing, user interface design, artificial intelligence applications such as OpenCV, server software development, and further developing teamwork skills.

Graduates have wide opportunities to find a job in IT companies. For example, according to statistics by Lursoft, as of the beginning of 2022, 84 Information Technology companies are working in Liepāja, the Latvia's third largest city. After their studies, most of international students return to their home country, where they start working in local IT companies or in a well-paid position in government institutions as an IT specialist. Some of international graduates go to other countries of the European Union to start either their Master's studies or their professional career in IT companies.

[1]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_videja_un_ilgtermina_prognozem)

[2] [http://viaa.gov.lv/lat/zinatnes\\_inovacijas\\_progr/viedas\\_sPECIALIZACIJAS\\_iev/viedas\\_spec\\_ieviesana/](http://viaa.gov.lv/lat/zinatnes_inovacijas_progr/viedas_sPECIALIZACIJAS_iev/viedas_spec_ieviesana/)

[3]

[https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j\\_salmins\\_darba\\_tirgus\\_parkartojumi\\_ekonomikas\\_izaugsmei20160519.pdf](https://ec.europa.eu/latvia/sites/latvia/files/docs/body/j_salmins_darba_tirgus_parkartojumi_ekonomikas_izaugsmei20160519.pdf)

[4]<http://nra.lv/latvija/izglitiba-karjera/153292-ikt-nozare-attistas-specialistu-trukums-arvien-izteiktaks.htm>; date of access:20.10.2015.

[5][http://www.tvnet.lv/tehnologijas/nozares\\_jaunumi/628033-tikai\\_21\\_meitenu\\_un\\_127\\_zenu\\_plano\\_savu\\_karjeru\\_saistit\\_ar\\_it\\_nozari](http://www.tvnet.lv/tehnologijas/nozares_jaunumi/628033-tikai_21_meitenu_un_127_zenu_plano_savu_karjeru_saistit_ar_it_nozari); 01.10.2016.

[6]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_videja_un_ilgtermina_prognozem),

[7]

[https://www.em.gov.lv/lv/nozares\\_politika/tautsaimniecibas\\_attistiba/informativais\\_zinojums\\_par\\_da\\_rba\\_tirgus\\_videja\\_un\\_ilgtermina\\_prognozem/](https://www.em.gov.lv/lv/nozares_politika/tautsaimniecibas_attistiba/informativais_zinojums_par_da_rba_tirgus_videja_un_ilgtermina_prognozem/)

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

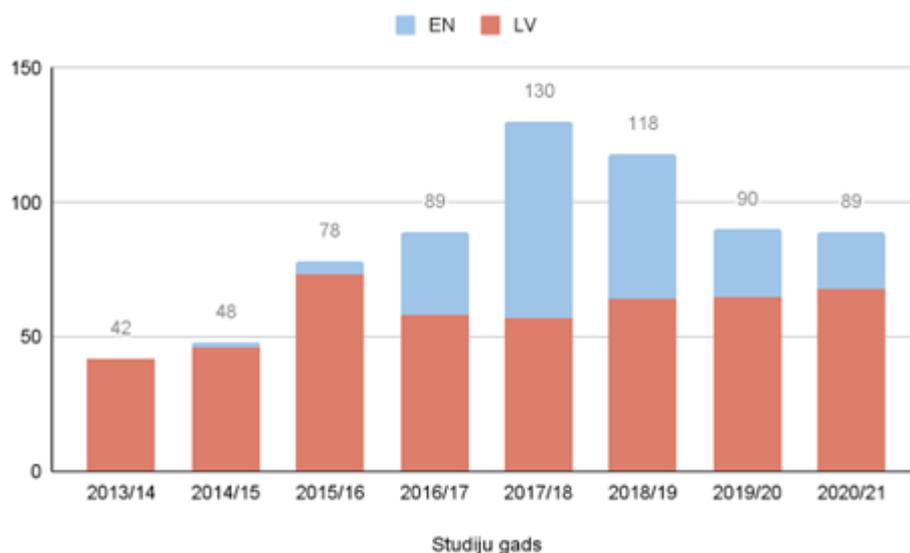
In the spring of 2022, 87 students have enrolled in the professional bachelor's study programme, 63 of them study in Latvian and 24 in English. The dynamics of the number of students since 2013 is shown in Table 3.1.4.1. Here you can see the changes in the total number of students enrolled in the professional bachelor's degree programme "Information Technology", as well as the changes in

the number of students enrolled in the first year of study, the number of drop-outs and the number of graduates. Data are presented separately depending on the language used in the study process - Latvian (LV) and English (EN).

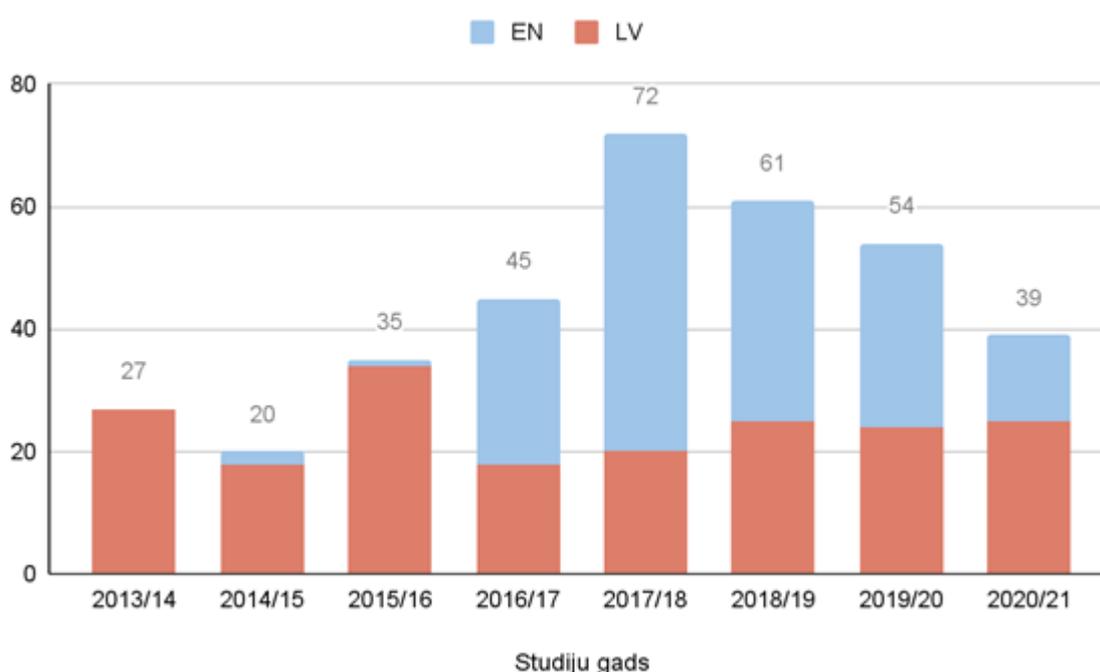
**Table 3.1.4.1. Dynamics of the number of students from 2013 to 2022**

Year	Number of students			Number of students matriculated in the first year of study			Dropped-out			Graduates		
	Total	LV	EN	Total	LV	EN	Total	Failed	By their own choice	Total	LV	EN
2013/14	<b>42</b>	42	0	<b>27</b>	27	0				-	-	-
2014/15	<b>48</b>	46	2	<b>20</b>	18	2				-	-	-
2015/16	<b>78</b>	73	5	<b>35</b>	34	1	<b>27</b>	19	8	<b>9</b>	9	0
2016/17	<b>89</b>	58	31	<b>45</b>	18	27	<b>28</b>	18	5	<b>7</b>	7	0
2017/18	<b>130</b>	57	73	<b>20</b>	20	52	<b>66</b>	55	11	<b>12</b>	12	0
2018/19	<b>119</b>	64	54	<b>52</b>	25	36	<b>63</b>	54	9	<b>10</b>	10	0
2019/20	<b>90</b>	65	25	<b>54</b>	24	30	<b>34</b>	24	10	<b>6</b>	4	2
2020/21	<b>89</b>	68	21	<b>39</b>	25	14	<b>33</b>	22	11	<b>14</b>	10	4
2021/22	<b>98</b>	75	23	<b>53</b>	34	19	<b>33</b>	8	25	<b>13</b>	11	2

Figures 3.1.4.1 and 3.1.4.2 visually show the changes in the total number of students over the years and the changes in the number of students matriculated in the first year over the years.



**Figure 3.1.4.1. Dynamics of the total number of students from 2013 to 2021**



**Figure 3.1.4.2. Dynamics of the total number of first year students from 2013 to 2021**

Each year, around 20-25 students are admitted to the Latvian stream. In 2015, enrolment in the related academic Bachelor's degree programme "Computer Science" was suspended, concentrating student enrolment in one programme. Unfortunately, in the following year - 2016 - the demographic "pothole" reduced the number of applicants to 18. However, in the following years, the number of students enrolled stabilised in the 20-25 range.

In 2014, the first foreign students are admitted. In the first two years, in the test mode, very few students were admitted, but later, thanks to the active work of the LiepU Foreign Relations Department, the number of foreign students in the study programme increased significantly. Unfortunately, the restrictions on movement introduced during the Covid-19 pandemic have led to a significant drop in the number of international students in 2020 and 2021.

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

## **3.2. The Content of Studies and Implementation Thereof**

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

The development of the study programme is influenced by trends in the development and digitisation of global society. ICT products are playing an increasingly important role in the economy, in global, national and regional affairs, in education, in society and in the daily lives of individuals. Long-term forecasts point to a growing demand for professionals who can create, maintain and use digital products and services. According to the Latvian Information and Communication Technology Association (LIKTA) ([likta.lv](http://likta.lv)), the ICT sector is one of the most export-oriented sectors of the economy, for example, in 2021 53% of the ICT sector's turnover was export. According to the information gathered by the Liepāja Digital Innovation Park, at the beginning of 2022 there were 84 ICT companies operating in Liepāja. Some of them, together with Liepāja University and organisations (foundations and associations) interested in ICT and industry development, established the Liepāja Technology Cluster in 2020, which aims to promote IT skills at all levels, among different groups of society, attract highly qualified specialists, raise public awareness about technology and develop the Liepāja IT ecosystem. Representatives of ICT companies working in Liepāja have also pointed out at various meetings and seminars that software projects have been rejected due to lack of IT specialists.

In the development of the study programme content, determination of the aim, objectives, planned study results and study approaches the ACM guidelines "CC2020 - Computing Curriculum 2020" , "Software Engineering 2014 Curriculum Guidelines for Undergraduate Degree Programmes in Software Engineering (SE2014)" as well as the experience of various international and Latvian universities in the organization and implementation of basic studies in the field of information technology were taken into account. Several proposals and ideas for the content of the study programme and approaches to its implementation have been gathered and analysed over the years in meetings with representatives of IT companies - both in discussions after the defence of bachelor and master theses in the study programme "Information Technology" and in specially organised seminars.

The achievability of the planned study outcomes and their relation to the study courses planned in the study programme can be seen in the study course mapping table (Annex 8).

The achievement of the aims, objectives and defined study results of the study programme "Information Technology" is ensured by the content of the study programme. The content of the study programme is implemented in compulsory, compulsory elective and free elective study courses, 2 internships and the development and defence of the bachelor thesis. The compliance of the study courses with the national standard for the second level of vocational higher education can be found in Annex 6, and their compliance with the standard for the profession "Software Engineer" - in Annex 7.

Most of the courses are divided into 10 credit point (or 15 ECTS) modules, each of which culminates in a module project. The exceptions are a number of general education courses and maths courses that are scheduled outside the modules. 1-2 modules are implemented in each semester, except the final - the eighth - semester. In the first semester, students take the module "Software Development I", which ends with a practical presentation on programming problem solving. The second semester module focuses on the development of students' first software project - a web-based database system. In the third and fourth semesters, in the modules "Software Engineering I" and "Software Engineering II", students take courses that cover the full software life cycle. The third semester module concludes with the presentation of a prototype study project. At the end of the fourth semester module, students present a web-based database system (more complex and extensive than in the second semester) and full documentation of the software project according to Latvian and international standards of software engineering. First and second year students work on their projects in teams, usually with 3-4 people in each team.

In the fifth semester, students must take one compulsory module on "Computer systems and networks" and one compulsory elective module on "Applications of artificial intelligence", "Smart technologies", "Advanced course of the School of Computing" or "Exchange semester at a partner university abroad". The study module "Computer Systems and Computer Networks" provides knowledge and skills that graduates can later use as IT consultants, IT department managers or computer systems administrators in companies. The sixth semester module "Software Engineering III" provides advanced knowledge and skills in software engineering. The module concludes with a presentation of an individual software project. In the seventh semester, students have the option to choose a compulsory elective module not chosen in the 5th semester.

Course descriptions are included in Annex 9.

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

**3.2.3. Assessment of the study programme including the study course/ module implementation methods by indicating what the methods are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. In the case of a joint study programme, or in case the study programme is**

**implemented in a foreign language or in the form of distance learning, describe in detail the methods used to deliver such a study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.**

Study programme courses take place in form of lectures, seminars, practical classes, tutorials, internships; through students' independent work; e-learning tools are available on Moodle <https://estudijas.liepu.lv/?lang=en>

The study programme is carried out in modules, with each module having a final project, assignment or set of assignments. Each course in the module contributes a part of the final project. This helps to reduce student workload and gives an insight into how different entities interact with each other, allowing a basic level understanding of how projects are implemented in a corporate environment.

Liepaja University Regulations on course/module examinations (link to the electronic document here:

[https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course\\_Module%20Examinations.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf)

Ensures objective assessment of students' knowledge and promotes systematic study work during the semester. The assessment of the programme follows generally accepted principles such as:

- The principle of assessment transparency, which is a set of requirements for the assessment of the learning outcome in accordance with the aims and objectives of the study programme and study courses;
- Summative principle for positive achievements, where the learning is assessed by summing positive achievements;
- the mandatory nature, which requires a pass grade for the entire content of the study programme;
- the principle of varied testing, using different types of tests to assess acquisition;
- The principle of reviewability, for which the University has established procedures for reviewing the marks obtained;
- the principle of relevance, which enables the assessment to demonstrate ability, knowledge, skills and competences at all levels of learning, in appropriate tasks and situations.

Examinations and assessments may use different forms of testing, such as oral, written, combined and computer-based. Consultations are available to students before exams.

The main forms of knowledge assessment are tests, quizzes, seminars, discussions, coursework, etc. Students' knowledge is also assessed at the end of their studies, mainly during the examination periods twice a year. To ensure a student-centred approach, the final assessment is predominantly a cumulative assessment, including the student's work throughout the course. This is done on a course-by-course basis, taking into account the specificities of each course.

**3.2.4. If the study programme envisages an internship, describe the internship opportunities offered to students, provision and work organization, including whether the higher education institution/ college helps students to find an internship place. If the study programme is implemented in a foreign language, provide information on how**

**internship opportunities are provided in a foreign language, including for foreign students. To provide analysis and evaluation of the connection of the tasks set for students during the internship included in the study programme with the learning outcomes of the study programme (if applicable).**

LiepU Faculty of Science and Engineering has signed cooperation agreements with several IT companies in Latvia and Liepaja, which includes a promise to accept students for internships. During the previous accreditation period, cooperation agreements were concluded with the following IT companies: Emergn Latvia (Exigen Services Latvia), Accenture Latvia, TestDevLab, Microsoft Latvia, MikroTiks, Tilde, Lursoft IT, Tieto Latvia, "Like A Coffe", ProgoTEAM, S-Tec Latvia, IT Līderis, Enters, "Fantasyposh Latvia", "Highfive", "Passive Management", "Giraffe360", DEVS.LV, Tet, UPB, AE Partner, InPass, as well as with Kurzeme Business Incubator, Latvian Chamber of Commerce and Industry, Latvian Information and Communication Technology Association (LIKTA), Microsoft IT Academy Program, Liepaja City Council, etc. In the case of each individual student, tripartite internship agreements are concluded between LiepU, the internship company and the student. The company undertakes to provide the intern with work duties appropriate to the internship programme and/or the occupational standard during the internship. In addition, a suitably qualified consultant is appointed by the company to coordinate and advise students during their internship.

Foreign students have fewer options for internships due to language barriers. But the problem is not critical. Many IT companies work on international software projects where English is the working language, and are therefore willing to take on international students. Tripartite internship agreements are in Latvian, but the student has access to an English translation of the document.

Some international students have chosen internship in IT companies in Latvia, for example, Accenture, Passive Management, Liepājas Digital Innovation Park, TestDevLab, etc.

Many of the international students use the internship as an additional opportunity to spend time in another country during their studies, using both individual financial resources and the support of the Erasmus+ program. Thus, in 2017-2021, students of the Bachelor's and Master's study programs had internships in IT institutions abroad: Germany - 3, Poland - 1, Spain - 9, India -1, Italy - 4, Denmark - 1, Turkey - 2, Portugal - 4, in Hungary - 1, in France - 1

Employers' internship reports indicate that all students are good at organising their work, have good contact with company management and colleagues, and have sufficient theoretical and practical knowledge. All students received only the grades "good", "very good", "excellent" or "outstanding" for their internship.

Students also use the opportunity of Erasmus+ mobility internship placements. This option is mostly used by students of the programme taught in English. Students from the Latvian stream have little interest in study exchanges and internships abroad. The most important reasons for this, as students admit, are lack of motivation, fear of the unknown, lack of finances, family commitments, work in Liepaja.

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

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

Out of a total of 69 students who have defended their final theses, the most commonly seen topic category (59 topics or 86%) is software development and implementation. This topic popularity can be explained by the fact that upon successful defense of the final thesis, the student is also awarded the qualification of programming engineer or electronic commerce specialist. Software development and implementation provides an opportunity to demonstrate the necessary skills and knowledge included in the professional standards. The rest of the theses usually put more emphasis on research or optimization of already existing systems or their quality assurance.

Detailed summary of all topic categories can be viewed in table 3.2.6.1. One thesis topic can cover multiple categories.

**Table 3.2.6.1.**

**Category overview of final theses topics during the report period**

Category	Academic year							Total
	2015./ 2016.	2016./ 2017.	2017./ 2018.	2018./ 2019.	2019./ 2020.	2020./ 2021.	2021./ 2022.	
<b>Total number of theses</b>	9	7	12	10	6	12	13	69
Virtualization	0	0	0	0	0	0	1	1
Internet of things	0	2	0	1	0	1	0	4
Artificial intelligence and machine learning	0	0	0	1	2	2	0	5
Quality assurance	0	0	1	0	1	4	5	11
Smart city	0	0	0	0	0	1	0	1
Robots	0	0	0	1	0	0	0	1
Language digitization and processing	0	0	0	1	0	0	0	1

Cyber security and data protection	0	0	0	0	1	1	1	3
Blockchain	0	0	0	0	1	0	1	2
Optimization	1	1	0	1	0	1	1	5
Automatization	0	0	1	6	1	3	2	13
Data analysis	0	0	0	0	0	2	1	3
Data processing and modeling	0	1	0	0	1	1	1	4
Software development and implementation	8	7	12	7	5	10	10	59

Among the final theses topics there are also some of the top 20 most important trends in technology as determined by the Ministry of Economy of Latvia: internet of things (4 theses), smart city (1 thesis), blockchains (1 thesis), robots (1 thesis), cyber security and resilience (3 theses).

The summary of the final thesis results can be viewed in table 3.2.6.2. The highest proportion of evaluation is 7 (good), followed by 8 (very good) and 6 (almost good). The average evaluation of the final theses is also 7 (good).

**Table 3.2.6.2.**

**Evaluation summary of final theses**

Academic year	Evaluation							Total
	4	5	6	7	8	9	10	
2015./2016.		3	1	1	1	3		9
2016./2017.		1		5	1			7
2017./2018.	1	2	2	2	4	1		12
2018./2019.			3	1	4	2		10
2019./2020.	2	1	1			2		6

2020./ 2021.	3	4	1	3	1			12
2021./ 2022.	3	3	5	1	1			13
<b>Total</b>	<b>3</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>14</b>	<b>10</b>	<b>0</b>	<b>69</b>
<b>Total (%)</b>	<b>4</b>	<b>19</b>	<b>20</b>	<b>22</b>	<b>20</b>	<b>14</b>	<b>0</b>	<b>100</b>

### 3.3. Resources and Provision of the Study Programme

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

LiepU infrastructure for the implementation of study programmes is good - in the equipped study halls there are possibilities to use audio, video and projection equipment, interactive whiteboards, as well as computer equipment and measuring equipment installed in computer classes and physics laboratory. To support the study processes, the Faculty supervises 10 laboratories, 11 thematic classrooms, and 11 computer classrooms. 8 laboratories are located at Lielā iela 14, 2 at Kr.Valdemara iela 4.

Laboratories:

- Computer networks and systems laboratory (with 20 computer workstations; Lielā iela 14, Room 011),
- Prototyping laboratory (Lielā iela 14, room 004),
- Paper recycling laboratory (Lielā iela 14, room 003),
- Physics and mechatronics laboratory (Lielā iela 14, room 430),
- Ecotechnology laboratory (Lielā iela 14, Room 407),
- Environmental chemistry laboratory (Lielā iela 14, Room 407),
- High performance computing laboratory (Lielā iela 14, ),
- Smart technologies laboratory (Lielā iela 14, Room 427)
- Biogas laboratory (4 Kr.Valdemāra Street),
- Nanotechnology laboratory (Kr.Valdemāra iela 4).

Themed classrooms (14 Lielā iela):

- Software engineering classroom (with 18 computer workstations; room 415),
- Computer science and computer management classroom (with 13 computer workstations;

room 416),

- Programming room (with 20 computer workstations; room 437),
- Programming room (with 18 computer workstations; room 434),
- Mathematics classroom (with 13 computer workstations; room 426),
- Computer graphics room (with 13 computer workstations; room 337),
- Videoconference room (with 9 computer workstations, room 426a),
- Computer room (with 18 computer workstations; room 343),
- Computer room (with 11 computer workstations; room 402),
- Nature embassy (Room 403),
- Circular economy centre (Room 003),
- Environmental biology room (Room 412).

They are supervised by support staff - LiepU IT centre engineers and DIF 3 lab technicians - chemistry, physics, natural sciences.

LiepU library is a support for LiepU students and teaching staff members in the process of study and research, where users have at their disposal the Subscription (issuing and receiving information resources), Copy Room (copying, printing, scanning and binding), Reading Room (reading information resources on site in the library) and Group Discussion Room (upon users' request).

The library offers free use of databases for both students and staff. Available databases include "EBSCO eBooks Academic Collection", "EBSCO Academic Complete", "Science Direct", "Cambridge Journals Online", "Scopus", "Web of Science", special offer for students by "Lursoft" - "Studenta komplekts", as well as "Mārketinga rokasgrāmata" and "Uzņēmuma vadītāja rokasgrāmata" by Letonika and Dienas Bizness.

The following library services are being used particularly actively in the context of the epidemiological precautions and restrictions imposed as a result of the Covid-19 pandemic: 1) on-demand digitisation (subject to copyright) of monographic materials and serials; 2) user self-service book-drop box in the university lobby for independent book check-out, where books were stored in quarantine; 3) user self-service self check for independent book check-out and check-in; 4) remote access to the library's electronic resources via VPN protocol.

The faculty offers unpublished student papers of the relevant profile - bachelor theses in computer science, mathematics and physics, diploma projects and master theses in information technology.

Specialised literature in mathematics, computer science, information technology, physics and didactic materials are available to students in specialised classrooms and laboratories. The reading room in the Institute of Natural Sciences and Innovative Technologies houses collections of scientific articles, journals and other scientific literature in the fields of mathematical modelling, physics and information technology. Some of the methodological materials are available to students in electronic form in the course management system Moodle.

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

### **3.3.3. Indicate data on the available funding for the corresponding study programme, its**

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

The funding of studies from the state budget is allocated each calendar year in accordance with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists.

The calculation of the projected costs of the study programme "Information technology" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1630.11 per one study place) and the coefficient of the thematic area of education "Computer science" established by the Ministry of Education and Science: 1.5, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2021 is EUR 2445.17.

The tuition fee for full-time study for the 1st year of the academic year 2022/2023 approved by the Liepaja University Senate is EUR 2100 for citizens of Latvia and the European Union and EUR 2500 for citizens of other countries, and it is unchanged for the entire study period. The minimum number of students in a study year in the full-time on-campus study programme is 18.

Since 2012, in the budget of Liepaja University of Applied Sciences there has been established a budget for the development and implementation of study programmes. The budget is planned and used for organising students' learning processes outside the university, for upgrading the material and technical base of the programmes (including laboratories), for recruiting qualified staff, etc.

A faculty science budget has been established to support the research (creative) activities of academic staff. The budget is planned and used for conference fees, travel expenses, organisation of scientific and methodological seminars, development of international cooperation, attraction of guest speakers, etc.

Liepaja City Municipality funding is available for attracting academic staff to ensure the quality of studies.

The use of FSE funding is regularly reviewed at meetings of the Faculty Council and the teaching staff, and at meetings of the Senate Budget and Development Committee.

LiepU has established quality management system procedures that support the study process - personnel management, financial management, IT, library and economic resources management, document management, project management, information circulation and public information management, as well as scientific and research management processes. For example, A-2-1 "Basic Budget Planning", A-2-2 "Basic Budget Execution and Control".

### **3.4. Teaching Staff**

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

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the Study Programme" of this report (3. Resources and facilities of the field of study). All teaching staff - docents, including guest teaching staff, involved in the study programme comply with the conditions for the implementation of the study programme and the requirements of the regulatory enactments (e.g., the Law on Higher Education Institutions).

The teaching staff of the LiepU Faculty of Natural Sciences and Engineering, docents of other LiepU faculties and researchers of the Institute of Natural Sciences and Innovative Technologies (DITI), specialists of the LiepU Information Technology Centre (ITC), as well as some guest lecturers are involved in the implementation of the field of study. All lecturers have a Master's or a Doctoral degree. The qualification level of the academic staff involved in the implementation of the study programme by study year can be seen in Table 3.4.1.1, which shows the percentage and number of teaching staff with Master's and Doctoral degrees.

**Table 3.4.1.1. The level of qualification of the academic staff involved in the implementation of the study programme.**

Year	Number of teaching staff	Master's degree		Doctor's degree	
		Number	%	Number	%
2015/16	40	30	75	10	25
2016/17	42	30	71	12	29
2017/18	39	27	69	12	31
2018/19	41	28	68	13	32
2019/20	41	28	68	13	32
2020/21	41	28	68	13	32

Most of the teaching staff have a Master's or Doctoral degree in computer science or information technology. Some docents have degrees in pedagogy or educational sciences, specialising in teaching methods in informatics, mathematics or physics. Docents of general education courses have a master's or doctoral degree in social sciences (management, economics, law, etc.) The qualifications of the teaching staff involved ensure the knowledge and competence necessary to prepare and conduct classes and to organise independent study work to support students' professional development. Visiting lecturers from abroad add an international dimension to your

studies. Invited IT professionals and lecturers, who work in IT companies alongside their university work, are able to pass on their practical work experience.

The number of elected academic staff members in the study program varies slightly from year to year, but it is around 25% of the total number of academic staff involved in the study program. For example, in the 2021/22 academic year, 9 elected academic staff members worked in the study program, including 1 professor, 1 leading researcher, 3 assistant professors, 4 lecturers, 1 visiting professor (Bulgaria). The other involved academic staff members are specialists at IT companies or educators from other educational institutions.

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

Changes in the composition of the teaching staff are mainly due to generational changes. The study programme involves several LiepU IT Master's graduates and doctoral students (see more in Chapters 2.6.1 and 2.6.2 of this report). In most cases, the changes have taken place gradually, the successors of the courses have been provided with consultations by experienced colleagues. Consequently, the quality of studies has not been significantly affected.

Unfortunately, due to age and health reasons, two Doctors of science - Dr.math. Jānis Rimšāns and Dr.math. Karlis Dobelis have left the study programme. Their courses have been taken over by Dr.math.Šarifs Guseinovs and Dr.math.Dace Kūma. They have rich previous experience working with students in similar courses in other universities and good cooperation with J. Rimšāns and K. Dobelis before taking over study courses. Therefore, the quality of studies was not significantly affected by it, except that the opportunities to involve the doctor of sciences in the implementation of other courses decreased.

In 2022 and 2023, the lecturers Linda Alksne and Valdis Priedols are expected to defend their Doctoral degrees in engineering.

As a result of the DIF's collaboration with DITI in the specialisation areas of artificial intelligence and smart technologies, the study programme involves DITI's leading researchers and researchers, ensuring the implementation of research-based studies.

Information on the teaching staff involved in the study programme can be found in section "II - Characteristics of the Study Programme" of this report (3. Resources and facilities of the field of study).

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

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

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

The teaching staff employed in the study programme cooperate in the development and implementation of joint research and projects within LiepU DITI, as well as in the development of the content of joint professional specialisation and theoretical courses in the field of study and in the exchange of information on current developments in the field and in the study process. The teaching staff members working in the study programme cooperate in the development and implementation of joint research and projects, and in the exchange of information on current developments in the field - through meetings at various industry exhibitions, international conferences, seminars and other networking events. Information exchange is ensured by regular meetings of the teaching staff at meetings organised by the Faculty and meetings within the framework of research activities at scientific institutes.

The Faculty of Sciences and Engineering has historically developed a good culture of internal collaboration. It has been created for decades by the most experienced colleagues of the faculty even before its establishment (in 2013). The current organizational culture has been adopted by the younger colleagues, too. Thus, no formal mechanism has been developed for the promotion of mutual cooperation between academic staff.

At the time of submission of the self-assessment report, the professional bachelor's study programme "Information Technology" involved 31 teaching staff members for 87 students.

# Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Diploma_Diploma_supplement_sample_ENG.pdf	Diploma_un_diploma_pielikuma_paraugi_InfTehn_bak_LV.pdf
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	A5_Statistika_IT_bachelors.pdf	P5_Statistika_IT_bakalauri.pdf
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	P6_AttilstibaValstsAlstandartam_Bit_ENG.pdf	P6_AttilstibaValstsAlstandartam_Bit.pdf
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)	P7_AttilstibaProfesijasStandartam_EN.pdf	P7_AttilstibaProfesijasStandartam_LV.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	P8_Kartejums_Bit_ENG.pdf	P8_Kartejums_Bit.pdf
The curriculum of the study programme (for each type and form of the implementation of the study programme)	ITbakalauri_TipveidaPlans_EN.pdf	ITbakalauri_TipveidaPlans_LV.pdf
Descriptions of the study courses/ modules	P10_kursa_apraksti_IT_bakalauri_EN.pdf	P10_kursa_apraksti_IT_bakalauri_LV.pdf
Description of the organisation of the internship of the students (if applicable)	Regulations on intership in Liepaja University.doc	Noteikumi par praksi LiepU.doc
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		

# Smart Technologies and Mechatronics (42523)

Study field	<i>Information Technology, Computer Hardware, Electronics, Telecommunications, Computer Management, and Computer Science</i>
ProcedureStudyProgram.Name	<i>Smart Technologies and Mechatronics</i>
Education classification code	<i>42523</i>
Type of the study programme	<i>Professional bachelor study programme</i>
Name of the study programme director	<i>ULDIS</i>
Surname of the study programme director	<i>ŽAIMIS</i>
E-mail of the study programme director	<i>uldis.zaimis@liepu.lv</i>
Title of the study programme director	<i>profesionālais maģistra grāds informācijas tehnoloģijā (Mg.sc.ing.)</i>
Phone of the study programme director	<i>+37129101515</i>
Goal of the study programme	<p><i>The goals of the professional higher education study program "Smart Technologies and Mechatronics" are:</i></p> <ul style="list-style-type: none"> <li><i>• to promote the growth of specialists in the sectors of the national economy in which modern electromechanical equipment is managed with integrated application of electronics and computer equipment</i></li> <li><i>• to promote the development of computer control in the region and the country;</i></li> <li><i>• to provide conditions for obtaining high-quality and competitive higher professional education in computer control by preparing specialists who are able to carry out academic and applied research in computer control science (branch of science - 2.2. Electrical engineering, electronics, information and communication technologies);</i></li> <li><i>• to give bachelors of the study program "Smart Technologies" the opportunity to obtain a master's degree in engineering, mechatronics, adaptronics, transport, etc., continuing their education. areas, as well as the relevant professional competencies;</i></li> <li><i>• to promote the development of a creative, responsible and motivated personality for lifelong learning.</i></li> </ul>

Tasks of the study programme	<p>The tasks of the study program “Smart Technologies and Mechatronics” are:</p> <ul style="list-style-type: none"> <li>• to create conditions and opportunities for students to obtain professional education in mechatronics. Mode of achievement:</li> <li>- to provide the intellectual and material resources necessary for the implementation of the bachelor's program in accordance with the program standard;</li> <li>- to promote independent studies by providing the necessary resources and control of the necessary study work;</li> <li>- to involve students in research work, developing research skills.</li> <li>• to provide a scientifically based understanding of modern automatic control, data transmission, remote control systems, their development and development trends. Mode of achievement:</li> <li>- to create conditions and environment for acquiring knowledge about the development of computer control disciplines, their interrelationships and interactions and possibilities of practical application;</li> <li>- to ensure the continuous improvement of the program.</li> </ul>
Results of the study programme	<ol style="list-style-type: none"> <li>1. Is able to demonstrate a comprehensive and specialised knowledge and understanding of the facts, theories, patterns and technologies relevant to the professional field of mechatronics</li> <li>2. Is able to perform practical tasks in the mechatronics profession in an analytical manner, to demonstrate skills that enable creative solutions to professional problems, to discuss and to reasonably debate practical issues and solutions in the profession with colleagues, clients and management, and to learn further with an appropriate degree of independence, developing their competences.</li> <li>3. Is able to evaluate and to improve own and others' performance, to work collaboratively with others, to plan and to organise work in order to carry out specific tasks in the profession, and to carry out or supervise work activities that are subject to unpredictable change</li> <li>4. Is able to formulate, to describe and to analyse practical problems in the mechatronics profession, to select the necessary information and to use it to solve clearly defined problems.</li> <li>5. Is able to participate in the development of the mechatronics profession, to demonstrate an understanding of the place of the mechatronics profession in the wider social context.</li> </ol>
Final examination upon the completion of the study programme	Bachelor's thesis

## Study programme forms

### Full time studies - 4 years - latvian

Study type and form	Full time studies
Duration in full years	4
Duration in month	0
Language	latvian
Amount (CP)	160

Admission requirements (in English)	<i>Secondary education</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional bachelor's degree in mechatronics</i>
Qualification to be obtained (in english)	<i>Mechatronics Engineer</i>

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IEĻA 14, LIEPĀJA, LV-3401

### Full time studies - 4 years - english

Study type and form	<i>Full time studies</i>
Duration in full years	<i>4</i>
Duration in month	<i>0</i>
Language	<i>english</i>
Amount (CP)	<i>160</i>
Admission requirements (in English)	<i>Secondary education and a minimum level of B2 in English</i>
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	<i>Professional bachelor's degree in mechatronics</i>
Qualification to be obtained (in english)	<i>Mechatronics Engineer</i>

### Places of implementation

Place name	City	Address
University of Liepāja	LIEPĀJA	LIELĀ IEĻA 14, LIEPĀJA, LV-3401

## 3.1. Indicators Describing the Study Programme

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

Accreditation of the professional higher education study programme "Smart Technologies and Mechatronics" is carried out for the first time.

In the licensing process in 2021, the commission made a request to increase the number of credits in the study course "Manufacturing technologies" to 6 KRP - done, to introduce the study course "Hydraulics and pneumatics" in the amount of 2 KRP - done, to remove the Latvian language from the planning for the English language group - done, and to supplement material support with 2 CNC machine tools within 5 years. One will be purchased in late 2022/2023. at the beginning of the year, the second - within two years.

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

At the Liepaja University, science programmes are implemented at the Faculty of Science and Engineering (FSE) - the newest of the 4 training units. The following study programmes are implemented at the DIF:

- *Professional bachelor study programme "Information Technology"*
- *Professional bachelor study programme "Smart Technologies and Mechatronics"*
- *Academic bachelor study programme "Computer Sciences"*
- *Professional master study programme "Information Technology"*
- *Doctoral study programme "E-Study Technologies and Management"*
- *Professional bachelor study programme "Environmental Innovation Technologies"*
- *Professional master study programme "Ecotechnologies"*

Faculty's goals:

- to provide a supportive and creative environment for quality, innovation-driven higher professional and/or academic education in natural sciences and engineering;
- to ensure the stabilisation of the Faculty's scientific potential and the achievement of quantitative and qualitative indicators in line with the University's criteria, systematically promoting the development of academic staff;

- to strengthen the study fields under the supervision of the Faculty, ensuring the quality of study programmes, increasing the number of students and offering new study programmes in international and national demand;
- to strengthen the public visibility of the Faculty's activities and results through targeted planning and implementation of a system of marketing activities.

Professional Bachelor study programme "Smart Technologies and Mechatronics" is a joint programme of the Liepaja University (LiepU) and Ventspils University of Applied Sciences (VUAS); according to the SAM project "Reduction of fragmentation of study programmes at Liepaja University" (No. 8.2.1.0/18/I/002), it has been developed and will be implemented in cooperation between the two higher education institutions. The lead organisation is the Liepaja University.

LiepU study programme "Smart Technologies and Mechatronics" will be implemented at the Faculty of Science and Engineering (FSE) in study direction "[Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science](#)" (Latvian only), replacing the current programme "Mechatronics". This choice is determined by:

- rapid development of techniques, technologies and materials - not only in manufacturing, but also in household and domestic appliances, which are controlled and operated using programmable electronics; new generation smart materials are widely used; optimisation methods and programmable electronics are applied in the development of mechatronic devices;
- changes in the production organisation - in many cases the conveyor has been abandoned, programmable machine tools are used, work groups are formed for project implementation, the share of individual orders has increased (e.g. in LSEZ companies "Trelleborg Wheel Systems Liepaja Ltd. (SIA)", "Silkeborg Spaantagning Baltics Ltd. (SIA)", etc.).

At Ventspils University College the study programme "Smart Technologies and Mechatronics" will be implemented at the Faculty of Information Technologies (ITF). The Faculty implements the first-level higher education study programme "Programming Specialist", three bachelor study programmes "Computer Science", "Electronics Engineering" and "Ship Navigation Electronics" and two master study programmes "Computer Science" and "Electronics". The study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" is accredited for a maximum period of six years. The ITF has extensive and modern new laboratories, and its work-oriented study programmes ensure the training of qualified professionals. Foreign lecturers from Lithuania, Belarus, Estonia, France, the Netherlands, Germany, the USA, etc. also participate in the implementation of the Faculty's study programmes.

Ventspils University College is active in attracting international students. The international market offers bachelor's and master's degrees in Computer Science and Electronics.

The developed study programme "Smart Technologies and Mechatronics" will offer students competitive studies of national and international importance for the development of the region, will implement nationally and internationally recognised research related to the studies and will contribute to the sustainable development of society.

**The program corresponds to the study direction** "Information technology, computer engineering, electronics, telecommunications, computer management and computer science" - it is determined by the high proportion of exact sciences (mathematics, physics, informatics, programming, construction, robotics, etc.) in the total range of courses and the operation, development and the essence of service - it is based on mechanics, electronics and programming. Accordingly, the name of the program "Smart technologies and mechatronics", the goals, tasks, achievable results and admission requirements of the program are defined.

## **The goals, tasks and planned study results of the study program "Smart technologies and mechatronics".**

The goals, tasks and planned study results of the study program "Smart technologies and mechatronics" are aligned with the standard of the profession "Engineer in mechatronics" (PS0097).

### **Objectives of the study program**

The goals of the professional higher education study program "Smart technologies and mechatronics" are:

- promote the growth of specialists in sectors of the national economy, in which management of modern electromechanical equipment is carried out with the integrated application of electronics and computer engineering;
- promote the development of the field of computer management in the region and the country;
- to provide conditions for obtaining high-quality and competitive higher professional education in computer management by preparing specialists who are able to carry out academic and applied research in the science of computer management (field of sciences - 2.2. Electrical engineering, electronics, information and communication technologies);
- to give the opportunity to the bachelors of the "Smart technologies and mechatronics" study program, while continuing their education, to obtain a master's qualification in engineering, mechatronics, adapttronics, transport, etc. areas, as well as corresponding professional competences;
- promote the development of a creative, responsible and lifelong learning-motivated personality.

### **Tasks of the study program**

The tasks of the "Smart Technologies and Mechatronics" study program are:

- create conditions and opportunities for students to obtain professional education in mechatronics. How to reach:
- to provide the intellectual and material resources necessary for the execution of the bachelor's program according to the program standard;
- promote independent studies by providing the necessary resources and the necessary study work control;
- involve students in research work, developing research work skills;
- o provide a scientifically based understanding of modern automatic control, data transmission, remote control systems, their development and development trends. How to reach:
- create conditions and an environment for acquiring knowledge about the development of computer management disciplines, their interrelation and
- interaction, and the possibilities of practical application;
- ensure continuous improvement of the program.

### **Achievable study results of the study program**

A professional bachelor's degree and fifth-level qualification is awarded to a learner who, as a mechatronics engineer, develops technological process automation algorithms; manages the design of computer control systems; performs equipment operation monitoring and their assembly tasks; uses special knowledge and skills to solve various practical technical problems or tasks; designs and develops possible automation options; advises on the efficiency of the automation process, on the latest achievements in the field of computer control technology, and the

possibilities of their implementation.

A mechatronics engineer works in companies that control electromechanical equipment with the integrated application of electronics and computer equipment.

Upon completion of studies, the student obtains a diploma of professional higher education.

Degree Pursuing: Professional Bachelor of Science in Mechatronics.

Obtainable qualification: Mechatronics engineer (professional code - 2512 04).

The verifiability of the fulfillment of goals and tasks is reflected in the study results, confirming the competences acquired by the student. The results foreseen in the study program are formulated in the form of knowledge, skills and competences and they correspond to the professional qualification to be obtained.

Knowledge:

- knows the stages of development of constructors' documentation;
- knows how to execute assembly and detail working drawings;
- able to perform the main accuracy and optimization calculations of mechanical, electronic and computer engineering equipment;
- knows the causes of the most frequent failures of mechanics, electrical equipment, electronics and computer equipment and the principles of their prevention.

Skills:

- able to design mechatronic equipment;
- able to lead a joint working group of mechanics, electricians, electronics and computer specialists for the design of mechatronic systems;
- able to monitor the operation of mechatronic equipment;
- able to perform tasks of assembling mechatronic equipment.
- able to demonstrate the basic and specialized knowledge characteristic of engineering and mechatronics and a critical understanding of this knowledge, including presenting part of the knowledge in the highest achievements of engineering and mechatronics;
- using the acquired theoretical foundations and skills of mechatronics, is able to perform professional, innovative or research activities;
- able to make decisions and solve problems in engineering and mechatronics;
- is able to independently structure his learning, direct his and his subordinates' further education and professional development;
- able to take responsibility and initiative when working individually, in a team or managing the work of others, to make decisions and find creative solutions in changing or uncertain circumstances.

Competence:

- understands the mutual interaction of mechanics, electromechanics, electronics and computer engineering equipment;
- knows how to predict the failure-free operation of mechanics, electrical equipment, electronics and computer equipment;
- knows how to find the causes of mechanical equipment damage and eliminate them;
- knows how to work with ready-made programs intended for the control of mechatronic equipment
- able to organize both group work and work in a group;
- able to cooperate with representatives of other professional specializations;

- knows how to apply occupational safety, fire safety and environmental protection regulations;
- understands ISO, EC and other national standards in the field of mechatronics.

### **Admission conditions**

Students are admitted to the program electronically through a competitive process, based on the results of the centralized high school exams. This process is regulated by the annual admission rules for full-time and part-time studies approved by the LiepU Senate (in 2019 - "LiepU admission requirements and criteria for higher level study programs in the 2019/2020 academic year", LiepU order of the LiepU Senate of October 29, 2018 at the meeting, protocol No. 4) [1]. The number of budget and paid student places to be admitted is approved by the Senate of LiepU every year.

The basic admission criteria will be the same for all new LiepU study programs in the "Information Technologies and Natural Sciences" field of study:

- successful grades of the secondary education certificate year in all subjects with an average grade not lower than 6 points (if the average grade is lower than 6 points, there is a possibility to take a test - discussions);
- CE in Latvian language, mathematics, English language;
- entrance exam.

### **Selection criteria**

Competition criteria for persons who have obtained secondary education since 2004:

Mandatory requirements:

- CE (Centralized examinations) in Mathematics;
- CE in a foreign language or STIP in a foreign language.
- Additional requirements:
- FG (Final grade) or VE/I in algebra (mathematics); or
- FG or VE/I in Physics; or
- FG or VE/I in natural sciences; or
- FG or VE/I in informatics / programming.

Competition criteria for persons who obtained secondary education before 2004 (not including), as well as persons who obtained secondary education abroad or persons with special needs:

Mandatory requirements:

- FG or CE in Mathematics;
- FG or CE in a foreign language or STIP in a foreign language.
- Additional requirements:
- FG or SE (State exam)/T (Test) in algebra (math); or
- FG or SE/T in physics; or
- FG or SE/T in natural sciences; or
- FG or SE/T in informatics/programming.

### **Advantages**

- 1-3rd place winners of the Latvian national or regional student scientific conference in the Natural Sciences, Engineering and Technology Science section no more than 3 years before admission;
- 1-3. place winners in the Latvian state Olympiads in physics, mathematics, informatics no more than 3 years before admission;
- in addition, 2 points are obtained by those who have obtained vocational secondary

education with the qualification of mechatronic systems technician.

Persons who have won prize-winning places in Latvian national subject Olympiads, Latvian national/regional student scientific conferences, Latvian or international sports competitions (achievements no older than 3 years), according to the conditions of admission to study programs, can obtain the following additional points:

- for 1st place or 1st rank - 4 points;
- for 2nd place or 2nd rank - 3 points;
- for 3rd place or 3rd grade - 2 points;

Bonus points can only be earned for one benefit. These extra points do not add up.

Test - discussions (oral test for applicants with an average grade below 7 points):

- reason for choosing a profession;
- setting and justification of study goals;
- assessment of cooperation and leadership experience;
- research activities and projects;
- communication skills.

#### **Evaluation criteria for the entrance exam (for all applicants):**

- the ability to orientate and reflect on current events in the industry and related developments in society;
- professional motivation;
- the ability to express one's opinion in writing and orally, justifying one's opinion.

Prospective students receive information about opportunities to study in Liepāja's "Smart Technologies and Mechatronics" study program at informational events organized by the university at Liepāja University (for example, "Open Day", "Hands in Hand with a Student", "Shadow Day"), in the city of Liepāja and elsewhere in the country, Liepāja Homes page[2], as well as communicating with students and graduates of the program both privately and on social networks.

The admission of reflective students is regulated by the "Regulations of admission and matriculation procedure at Ventspils University of Applied Sciences", which is determined for each academic year by the decision of the VeA Senate. Admission rules have been developed in accordance with the Law on Universities and 10.10.2006. MK regulations no. 846 "Rules on requirements, criteria and procedures for admission to study programs".

The right to study at Ventspils University of Applied Sciences is available to citizens of the Republic of Latvia and persons with non-citizen passports of the Republic of Latvia, as well as persons who have been issued permanent residence permits. Admission of foreign applicants is organized in accordance with the rules approved by the VeA Senate "Terms of admission and the matriculation process for Ventspils University of Applied Sciences foreign candidates for studies in English-taught study programs".

The foreigner shall attach to the application a document issued by the international testing institution within the last five years, which certifies that the foreigner's proficiency in the language of the relevant study program is at least B2 level, if no other clause of Article 846 of the Code of Civil Procedure applies. The adequacy of the level of knowledge of the English language is evaluated when the applicant completes a language test that meets the requirements of the MK regulations.

[1] <https://www.liepu.lv/lv/37/uznemasnas-noteikumi> (Latvian only)

[2] <https://www.liepu.lv/lv/651/pieteiksanas-pamatstudijam> (Latvian only)

As a result of the cooperation, the strengths of both universities are rationally used - LiepU contributes to the development of the programme, implementation of the core courses (general education, most theoretical and professional specialisation courses, elective study courses, internship and state examination - a total of 144 CP), while VeA's cooperation is based on highly developed training management and technical support in the field of electronics. Ventspils University of Applied Sciences will offer 16 (i.e. 10% of 160) credit points of courses related to electronics and electromagnetism.

Studies will be organised in the form of dual studies.

After successfully passing the examinations and defending the bachelor's thesis, the graduates will receive a diploma of the university where the student is matriculated (LiepU or VUAS).

Study languages - Latvian, English, the content of the program is identical in both languages.

### **Documents regulating the development and implementation of the study program**

In the development of the new study program "Smart Technologies", the following have been observed:

- Guidelines of the SAM project "Reducing fragmentation of study programs in LiepU" (No. 8.2.1.0/18/I/002);  
Professional standard "Engineer in mechatronics" (PS0097). Standard status - valid.

### **Professional qualification and degree**

After the studies, students obtain a professional bachelor's degree in mechatronics and a level 5 qualification *Engineer in mechatronics*, which entitles graduates to start their own job or work in a company. The study programme "Smart Technologies and Mechatronics" provides graduates with professional competence and its development, and, in line with the Lisbon Strategy, provides graduates with opportunities to compete successfully in the labour market. It's provided by:

- the degree to be awarded and a single European Diploma Supplement ("*Diploma Supplement*"), which is comparable to related study programmes at other EU universities;
- alignment of the adopted credit system with the ECTS system;
- compliance of the programme content with the requirements of the study programme of the second level of professional higher education, which are set out for the Common European Area of Education and are also set out in Latvia by the Regulation of the Cabinet of Ministers of the Republic of Latvia No. 512 ("*Regulations on the Standard for the Second Level of Professional Higher Education*");
- the adequacy of the study programme's scientific research facilities to meet modern requirements;
- teaching staff involved in the implementation of study processes with the appropriate competences for sustainable education.

Graduates of the study programme may continue their education by studying in academic or professional master's study programmes at the Liepaja University, as well as at other Latvian and foreign higher education institutions.

The goals, objectives and study results of the study programme "Smart Technologies and Mechatronics " are not duplicated with other study programmes of LiepU.

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

Liepaja University study programme "Smart Technologies and Mechatronics" is implemented at the Faculty of Science and Engineering (FSE) within the study direction "Information Technology, Computer Engineering, Electronics, Telecommunications" in cooperation with the Institute of Natural Sciences and Innovative Technologies (DITI) and other Liepaja University institutions in a unified system (see Table 1).

#### **Departments involved in the implementation of the study programme "Smart Technologies and Mechatronics" within the study field "Information Technology, Computer Engineering, Electronics, Telecommunications"**

<b>Units involved in the implementation of study programmes</b>	<b>Tasks in the implementation of study programmes</b>
Faculty of Science and Engineering (DIF)	<p>Provides a supportive and creative environment for quality, innovation-driven higher professional and/or academic education in science and engineering.</p> <p>Ensures the stabilisation of the Faculty's scientific potential and the achievement of quantitative and qualitative indicators in accordance with the University's criteria, systematically promoting the development of academic staff.</p> <p>Strengthens the study fields under the supervision of the Faculty, ensuring the quality of study programmes, increasing the number of students, offering new study programmes in international and national demand.</p> <p>Strengthens the public visibility of the Faculty's activities and results through targeted planning and implementation of a system of marketing activities.</p>
Faculty of Humanities and Arts (HMZF) Faculty of Pedagogy and Social Work (PSDF) Faculty of Management and Social Sciences (VSZF)	<p>The study process is ensured in cooperation with the Kurzeme Institute of Humanities (KHI), the Institute of Educational Sciences (IZI), the Institute of Management Sciences (VZI), whose aim is to promote the integration of diverse research, study and innovative activities into the study process.</p>
Natural Sciences and Innovative Technologies Institute (DITI)	<p>DITI and its research centres (Nanomaterials Laboratory, Environmental Research Laboratory, Nature Embassy, Centre for Circular Economy) ensure the integration of research findings into the implementation of the study programme.</p>

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Board of Studies

It monitors the study programmes and the field of study, and examines and approves self-evaluation reports.

To strengthen the study base, LiepU envisages research and entrepreneurship cooperation with Liepaja University Science and Innovation Park, as well as cooperation with Kurzeme Business Incubator and Science and Innovation Park for the implementation of scientific research activities.

The study programme "Smart Technologies and Mechatronics" at Ventspils University of Applied Sciences will be implemented on the basis of the existing study direction "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" at Ventspils University of Applied Sciences. This direction is accredited until 2023.

The study programmes at Ventspils University of Applied Sciences have been developed with the active participation of employers and all ITF graduates have the opportunity to find a job in their field of specialisation. According to the Dynamic University study, a survey of local companies in the sector shows that the demand for information technology specialists (including electronics) in Ventspils will grow by more than 500% over the next 7 years, totalling more than 700 specialists.

According to the education and career portal prakse.lv, which conducts a survey of Latvian companies, Ventspils University of Applied Sciences's Bachelor Study Programme "Computer Science" has been ranked as the sixth most recommended IT study programme in the list of the most recommended educational institutions and studies by employers in 2016, and the bachelor study programme "Electronics" as the fifth most recommended study programme for electronics engineers.

The companies Transas Baltic Ltd., Hansa Electronics Ltd., Reids Ltd. have expressed interest in graduates of engineering studies at Ventspils University of Applied Sciences. Clients of these companies include the Latvian Navy, Latvian Border Guard, Riga Transport Fleet, Latvian Shipping, Latvian and Lithuanian fishing companies and other shipping companies in Latvia and abroad.

According to the information available to the Association of Mechanical Engineering and Metalworking Manufacturing Companies (<http://www.masoc.lv/masoc/>), there is currently a shortage of specialists in Latvia who are able to develop new products, design and maintain automated production lines, operate CNC (*Computer Numerical Control*) machines at a professional level, and perform set-up, maintenance and repairs. One of the priorities of the Latvian economy is to develop exports of manufacturing companies and to increase labour productivity. This can be done by introducing new competitive products and automating production. Mechatronics engineers are the professionals most directly involved in making this happen.

The LiepU programme "Smart Technologies and Mechatronics" is the basis for the Master's programme in Mechatronics and Adaptronics.

### ***Relevance of the study programme to the needs of the economy and the labour market***

During the preparation of the licensing materials, an employers' survey on the need for a study programme in "Smart Technologies" was carried out. 4 companies (*Trelleborg Wheel Systems Liepaja Ltd., Silkeborg Spaantagning Baltic Ltd., AE Partner, INPASS Ltd.*), whose activities are largely related to the development of new products, would like to hire mechatronics engineers today. Six respondents (Liepaja Special Economic Zone companies) admitted that their companies will need mechatronics engineers in the next 3 years; they plan the development of their companies, expect the economic situation to improve and production to increase; each company plans to hire 1 - 5 mechatronics engineers in this period. Employers point out that a mechatronics engineer needs to know and be able to identify faults in CNC equipment and fix them promptly, as

equipment idle time is very costly. Employers point out that the new specialist must continuously acquire new knowledge and be able to speak English or German in order to be able to communicate freely with CNC machine manufacturers, to inform them of machine faults, to receive advice from foreign specialists and, on this basis, to repair machine faults themselves. In this way, technicians continuously improve their professional level for the maintenance and repair of a specific CNC machine. The other key aspect that a mechatronics engineer needs to know is how to work with CAD (*Computer Aided Design*) programmes, perform design functions and develop new products. The third aspect: basic knowledge of manufacturing technology, CAM programmes, CNC machine control systems - *Heidenheim, Fanuc, Siemens*.

Profession Mechatronics Engineer is included in the list of professions where a significant labour shortage is forecast and where foreigners may be invited to work in the Republic of Latvia[1] - Cabinet of Ministers Regulation No. 108, Riga, 20 February 2018 (i.e. No. 11 26. §) "Specialities (professions) in which a significant labour shortage is forecast and in which foreigners may be invited to work in the Republic of Latvia".

Almost all graduates of the last six years work in the field of mechatronics in accordance with their professional qualification obtained at LiepU. All graduates are offered a job, but a small minority turn them down (family circumstances, insufficient pay, working conditions not in line with the job description of a mechatronics engineer). In summer/autumn of both 2018 and 2019, the director of the current Mechatronics study programme was contacted by employers in Kurzeme (2018, 2019) and Vidzeme (2019) regions to recommend their institutions as workplaces for graduates - however, all graduates were already working or had already agreed to take a job at another institution. This shows that there is a high demand for specialists and that graduates will be provided with jobs.

[1]<https://likumi.lv/ta/id/297537-specialitates-profesijas-kuras-prognoze-butisku-darbaspeka-trukum-u-un-kuras-darba-latvijas-republika-var-uzaicinat-arzemniekus>

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

In the spring of 2022, 11 students are enrolled in the professional bachelor's study programme "Smart Technologies and Mechatronics ", 11 of them in Latvian and 0 in English. The number of students is made up of 12 students enrolled in the first year and 4 students from the previous study programme "Mechatronics" who continued their studies in the second year of the programme "Smart Technologies and Mechatronics ". There are no students in higher courses or graduates yet. The dynamics of the number of students is shown in the table below.

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

Professional Bachelor's study programme "Smart Technologies and Mechatronics" is a joint programme of the Liepaja University (LiepU) and Ventspils University of Applied Sciences (VUAS); according to the SAM project "Reduction of fragmentation of study programmes at LiepU" (No. 8.2.1.0/18/I/002), it has been developed and will be implemented in cooperation between the two higher education institutions. The lead organisation is the Liepaja University.

LiepU study programme "Smart Technologies and Mechatronics" is implemented at the Faculty of Science and Engineering (FSE) in the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science", replacing the current programme "Mechatronics". This choice is determined by:

- rapid development of techniques, technologies and materials - not only in manufacturing, but also in household and domestic appliances, which are controlled and operated using programmable electronics; new generation smart materials are widely used; optimisation methods and programmable electronics are applied in the development of mechatronic devices;
- changes in the production organisation - in many cases the conveyor has been abandoned, programmable machine tools are used, work groups are formed for project implementation, the share of individual orders has increased (e.g. in LSEZ companies "Trelleborg Wheel Systems Liepaja Ltd. (SIA)", "Silkeborg Spaantagning Baltics Ltd. (SIA)", etc.).

The study programme "Smart Technologies and Mechatronics" is implemented at the Faculty of Information Technologies (ITF) of Ventspils University of Applied Sciences. The Faculty implements the first-level higher education study programme "Programming Specialist", three bachelor study programmes "Computer Science", "Electronics Engineering" and "Ship Navigation Electronics" and two master study programmes "Computer Science" and "Electronics". The study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" is accredited for a maximum period of six years. The ITF has extensive and modern new laboratories, and its work-oriented study programmes ensure the training of qualified professionals. Foreign lecturers from Lithuania, Belarus, Estonia, France, the Netherlands, Germany, the USA, etc. also participate in the implementation of the Faculty's study programmes.

Ventspils University of Applied Sciences is active in attracting international students. The international market offers bachelor's and master's degrees in Computer Science and Electronics.

The developed study programme "Smart Technologies and Mechatronics" will offer students competitive studies of national and international importance, necessary for the development of the region, will implement nationally and internationally recognised research related to the studies and will contribute to the sustainable development of society. The programme corresponds to the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" - this is determined by the high proportion of exact sciences (mathematics, physics, informatics, programming, design, robotics, etc.) in the total range of courses and the very nature of the operation, development and maintenance of mechatronic devices - based on mechanics, electronics and programming.

As a result of the cooperation, the strengths of both universities are rationally used - LiepU contributes to the development of the programme, implementation of the core courses (general education, most theoretical and professional specialisation courses, elective study courses, internship and state examination - a total of 144 CP), while VeA's cooperation is based on highly developed training management and technical support in the field of electronics. Ventspils University of Applied Sciences offers 16 (i.e. 10% of 160) credit points of courses related to electronics and electromagnetism.

Studies are organised in the form of dual studies.

After successfully passing the examinations and defending the bachelor's thesis, the graduates will receive a diploma of the university where the student is matriculated (LiepU or VUAS).

Study languages - Latvian, English.

## 3.2. The Content of Studies and Implementation Thereof

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

The Professional Bachelor's study programme "Smart Technologies and Mechatronics" is a conceptually new quality study programme for engineering education. The content of the study programme is developed in accordance with the requirements of the regulatory enactments. The goal, objectives and learning outcomes of the study programme in terms of knowledge, skills and competences have been developed in accordance with the European Qualifications Framework[1] (EQF) and the Latvian Qualifications Framework[2] (LCI) Level 5 and in accordance with the *professional standard "Mechatronics Engineer" (2002)[3]*.

At the University of Liepāja, the study program "Smart technologies and mechatronics" is implemented at the Faculty of Science and Engineering s (FSE) within the study direction "Information technology, computer engineering, electronics, telecommunications" in cooperation with the Institute of Science and Innovative Technologies (ISIT) and other LiepU institutions in a unified system, thus using the competence of LiepU in the fields of mechanics and IT.

The study program "Smart technologies and mechatronics" at Ventspils University of Applied Sciences is implemented using the basis of the study direction "Information technology, computer engineering, electronics, telecommunications, computer control and computer science" at Ventspils University of Applied Sciences. This direction is accredited until 2023.

Study programs at Ventspils University of Applied Sciences have been created with the active participation of employers, and all ITF graduates have the opportunity to find a job in their specialty. According to the "Dynamic University" research, the survey of local industry companies shows that in the next 7 years, the demand for information technology specialists (including electronics) in Ventspils will increase by more than 500%, which makes up more than 700 specialists in total.

According to the Education and career portal prakse.lv, which conducts a survey of Latvian companies, the Ventspils University of Applied Sciences bachelor's study program "Computer Science" has been rated as the sixth most recommended IT study program in the list of educational institutions and studies recommended by employers in 2016, and the bachelor's study program

"Electronics" as the fifth most recommended electronics engineering degree program.

The implementation of the study programme is based on a student-centred approach and the development of positive pedagogical relationships, involving students in the evaluation of the study process, providing feedback and improving the study programmes, while encouraging them to be independent and responsible in achieving the results of the study process. Graduates of the programme can continue their education in Master's degree programmes in education in Latvia and Europe.

Reduced fragmentation of programmes and sharing of resources are ensured by the joint delivery of theoretical courses in general education. Courses are also offered for continuing education.

The programme of study comprises 160 CP (240 ECTS) and their distribution is in accordance with the regulatory enactments: General study courses (20 CP), Theoretical courses (38 CP), Professional specialisation study courses (58 CP), Elective study courses (6 CP), Internship (26 CP), State examination (12 CP).

The professional bachelor's study program "Smart technologies and mechatronics" (42523) is implemented in Latvian and English languages; the program description and layout are identical in both languages.

The central axis of the study programme "Smart Technologies and Mechatronics" in the study process are theoretical and professional specialisation study courses in the field of engineering sciences, which cover solutions and problems of design, installation and operation of automatic equipment, provide knowledge and skills to operate automatic equipment used in machining, assembly, packaging and other technological processes, installing, setting up and organising work with them, these activities also involve mechanical, electronic, computer and information technology approaches. The study programme is implemented in accordance with the continuity of study modules, study courses and internships, they are mutually coherent and consistent in the context of the knowledge, skills and competences to be achieved. During the course of studies, eight modules or thematic groups are planned: Module I/Thematic Group - General Education Courses with Entrepreneurship Module (Semesters 1 to 8), Module II/Thematic Group - Mathematics (Semesters 1 to 8), Module III/Thematic Group - Mechanics and Design (Semesters 1 to 8), Module IV/Thematic Group - Electronics (Semesters 1 to 3), Module V/Thematic Group - Information Technology (Semesters 1 to 8), Module VI/Thematic Group - Electrical Engineering (Semesters 4 to 6), Module VII/Thematic Group - Innovation and Smart Technology Module (Semesters 6 to 8), as well as Final Thesis Module/Group (Semester 7 to 8, final internship (Internship III with an opportunity to go to the ERASMUS exchange programme abroad and development and defense of Bachelor's thesis)).

### ***General courses with an Entrepreneurship module***

The general education courses (20 CP) are designed to develop students into intelligent, communicative, managerial and entrepreneurial individuals. The module starts with an introduction to the study environment and infrastructure, and provides the skills and competences required to manage technical processes. The following courses are included:

- Introduction to Studies, Research and Technology (2 CP)
- Industry legislation (2 CP)
- Office software (2 CP)
- Technical English (2 CP)
- Business Administration (2 CP)
- Project Management (2 CP)
- Human Resources Management (2 CP)

- Business Communication (2 CP)
- Total Quality Management (2 CP)
- Production organisation and management (2 CP)
- \*Latvian (8 CP) - for foreign students

### ***Mathematics***

The Mathematics module (10 CP) includes the mathematical disciplines required for a mechatronics engineer, see the relevant course/module description for a more detailed breakdown.

### ***Mechanics and engineering***

The module provides students with the knowledge and skills to develop and design mechanical parts of devices, provides an understanding of manufacturing technologies and enables practical application of theoretical knowledge in the development of coursework.

### ***Electronics***

The electronics module is fully implemented at Ventspils University of Applied Sciences. The module includes the study courses "Fundamentals of Electronics", "Electronics", "Electricity and Magnetism", as well as 3 practical electronics courses "Electronics Engineering Project I, II, III".

### ***Information technology***

Programming and information technologies are an essential part of the study programme "Smart Technologies and Mechatronics". This module includes the following courses:

- Databases (2 CP)
- Internet of Things (4 CP)
- Robot Control (4 CP)
- Artificial Intelligence (2 CP)
- Simulation and Mathematical Modelling (2 CP)
- Software Engineering (2 CP)
- Cloud Computing Project (2 CP)
- Cyber Security (2 CP)

### ***Electrical Engineering***

The electrical engineering module includes the courses "Electrical Engineering and Electrical Drives" and "Sensors". The module covers DC and AC (single and three-phase) electrical engineering, electric drives, powertrain engineering, and sensor technologies and applications.

### ***Innovation and Smart Technologies module***

The Innovation and Smart Technologies module focuses on innovation in mechatronics, providing insights into the development, ideation and implementation of smart devices. Study courses:

- Innovation management (2 CP)
- Smart Technology Project I, II (4 CPs in total)

The study programme "Smart Technologies and Mechatronics" is offered full-time (4 years). The studies are planned in the form of a dual time plan, part of the time is spent in lectures and practical work classes at the Liepaja University, and part - working part-time in a workplace related to the subject of study. The programme is offered in two languages - Latvian and English. See Annex 6 for the programme outline and Annex 7 for module descriptions.

## **Programme compliance with the national standard for upper secondary vocational education**

Liepaja University Faculty of Natural Sciences and Engineering bachelor study programme "Smart Technologies and Mechatronics" is established in accordance with Cabinet of Ministers Regulation No. 512 "Regulations on the State Standard of the Second Level Professional Higher Education" (issued on 26.08.2014)[4].

The compulsory content of the Bachelor's programme provides a set of knowledge, skills and competences necessary for the exercise of professional activities, in line with the understanding of the profession of mechatronics engineer in the European Union. The programme volume consists of 160 CP, its content and structure are in line with the requirements set out in the above-mentioned regulations (see Table 3 and Annex 3).

### 1. table

#### **Structure of the study programme "Smart Technologies and Mechatronics" in accordance with the national standard for second-level professional higher education (OLPAI)**

<b>OLPAI national standard</b>	<b>SP "Smart Technologies", 1st study year</b>	<b>SP "Smart Technologies", 2nd study year</b>	<b>SP "Smart Technologies", 3rd study year</b>	<b>SP "Smart Technologies", 4th study year</b>	<b>SP "Smart Technologies", total</b>
Comprehensive courses: at least 20 CP	10 CP	4 CP	4 CP	2 CP	20 CP
Theoretical industry basic courses: at least 36 CP	20 CP	12 CP	4 CP	2 CP	38 CP
Industries professional specialisation courses: at least 60 CP	10 CP	18 CP	20 CP	10 CP	58 CP
Elective part: at least 6 CP	-	-	4 CP	2 CP	6 CP
Internship: at least 20 CP	-	6 CP	8 CP	12 CP	26 CP
Study works: 3	-	1	1	1	3
State tests: at least 12 CP	-	-	-	12 CP	12 CP
Total: 160 CP	Total: 40 CP	Total: 40 CP	Total: 40 CP	Total: 40 CP	Total: 160 CP

#### **Relevance of the programme to the professional standard**

The study programme "Smart Technologies and Mechatronics" has been developed on the basis of the requirements specified in the professional standard "Mechatronics Engineer" (profession code 2144 38), the requirements of the professional standard of the Republic of Latvia (Cabinet of Ministers Regulation No. 461 "Regulations on the Professional Classification, Basic Tasks and

Qualification Requirements Corresponding to the Profession and the Procedure for Using and Updating the Professional Classifier", Riga, 18 May 2010 (i.e. No. 25 33§). The relevance of the programme is shown in the table in the Annex.

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

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

The delivery mechanism of the study programme ensures the achievement of learning outcomes, incorporating the principles of student-centred learning. The student workload is equivalent to 40 academic hours of work per credit point. 1 CP includes contact hours (16) and students' independent work (24). Therefore, two forms of study are integrated in the process of learning the course content: classroom work and independent work.

Education is measured by the sum of positive achievements (pass marks). A pass mark is required for all content covered in the programme. In accordance with the goals, objectives and results set in the study programme and study courses, the basic requirements for the assessment of the acquired education have been established, which are based on the following principles: openness of assessment; obligatory nature of assessment; possibility of revision of assessment; variety of forms of examination (see *Regulations on examinations of study courses/modules*).<sup>[1]</sup> The basic principles of assessment of the study programme can be described in more detail as follows:

- the principle of aggregation of positive achievements - education is assessed by aggregating positive achievements;
- the principle of compulsory assessment - a pass mark is required for the mandatory content of the core parts of the programmes;
- the principle of openness and clarity of requirements: a set of core requirements for the assessment of learning is defined in line with the aims and objectives of the programmes and the goals and objectives of the courses;
- the principle of variety of assessment methods - different types of assessment are used to assess the learning of the study programme;
- the principle of relevance - the assessment provides opportunities to demonstrate analytical and creative abilities, knowledge, skills and competences in tasks and situations appropriate

to all levels of learning.

The content of the examinations shall be in accordance with the content of the course programmes and the skills and knowledge requirements set out in the Occupational Standard. The main forms of assessment for the completion of the study programme is examination and test. In the examination and in the test, the mastery of the course content is assessed on a 10-point scale.

The content of the study programme is organised around course requirements and internship assignments. At the end of the studies, the student develops and defends a bachelor thesis. The conditions for organising student internships and the support provided to students are defined and integrated into the study programme content.

Study form: Full-time, 4 years.

Study methods: lectures, seminars, discussion, individual, pair and group work, practical work, laboratory work, projects, independent work.

The expected results of the study process in the form of abilities, skills and competences are defined in the description of each study course, specifying the content and scope of independent work, the work to be submitted and participation in the study process. The student is expected to be responsible for his/her studies, to complete his/her independent work, to complete the tasks of the internship and to keep up to the work schedule.

The choice, content and scope of study courses, as well as the content of internship, shall be appropriate to the qualification of mechatronics engineer to be obtained, in accordance with the requirements of the professional standard for mechatronics engineers. The study content is structured in a sequence of study courses, internships, which ensure the gradual acquisition of competences. The content of studies is oriented towards the integration of theoretical and practical experience, studies are related to research, scientific and practical urgency.

The assessment of learning outcomes is determined by the assessment criteria and forms of examination specified in the study courses. The final examinations of the courses focus on the integration of theory into practice. The evaluation of the study process takes the form of assessment and evaluation. It aims to contribute to the development of competences and attitudes of future professionals. The evaluation is focused on the dynamics of knowledge, skills and competences acquired during the study process. This is done through seminars, coursework, group work, discussions, students' independent work and internships. The assessment of study results is carried out at the end of study courses and its form is determined by the assessment criteria and examination forms specified in the study courses. Depending on the specifics of the course of study, examinations are organised individually or in groups, and may take the form of a written test or colloquium, or the presentation and defence of a topic studied in depth during the course of study. In the study programme, assessment is mostly implemented according to the cumulative principle. Cumulative principle assessment promotes students' responsible attitude towards the study process and encourages students to acquire knowledge systematically and systematically, to complete independent work assignments on time, and to participate in lectures, seminars and practical work. Self-reflection is an important form of assessment of the competences acquired during the study process.

Multimedia technologies, study materials for successful learning of the course content, as well as tests and other types of examinations available in the e-learning environment are used in the study process. The e-learning environment provides the opportunity to individualise the study process according to the needs and interests of each student.

Credit is awarded for each course of study taken if a grade of at least 4 (almost satisfactory) on a

10-point scale is obtained.

At the end of the study programme, the final state examination is taken - the defence of the bachelor's thesis, which is also evaluated on a 10-point scale. The National Final Examination Board shall be composed of a chairperson and at least four members. The head of the Commission and at least half of its members are professional employers or representatives of the sector.

A diploma of higher education attesting the level of professional qualification as a Mechatronics Engineer is awarded to a student who has completed the programme and passed the bachelor's examination with a mark of not less than 4 - "almost satisfactory". The content of the Bachelor's Programme provides a set of knowledge, skills and competences in accordance with the Latvian Framework of Education Level 6 and Level 5. Latvian professional qualification level.

The implementation of the study programme is based on a student-centred approach and the development of positive pedagogical relationships, involving students in the evaluation of the study process, providing feedback and improving study programmes, while encouraging them to be independent and responsible in achieving the results of the study process. The nature of student-centred teaching and learning: takes into account and respects the diversity of the student contingent and their needs; takes into account and uses different ways of delivering programmes; uses a variety of pedagogical methods as appropriate to the circumstances; encourages the learner to strive for independence; promotes mutual respect between learner and teacher; has appropriate procedures for dealing with student complaints. However, the student-centred approach to the study process does not reduce the demands on students to acquire the knowledge, skills and competences of a specialist - Engineer.

When designing the study programmes and courses, special attention is paid to the meaningful formulation of learning outcomes, thereby promoting students' understanding of and ownership over their own learning, self-assessment and performance evaluation. Methods, forms of examination and evaluation criteria appropriate to the aim of study and the planned study results will be used in the study process.

In the study process of study programmes of the study direction "Information Technology, Computer Engineering, Electrical Engineering, Telecommunications, Computer Management and Computer Science", including the programme "Smart Technologies and Mechatronics", the following dimensions are taken into account to ensure the unity of theory and practice, to create a supportive and inclusive study environment and to ensure the quality of the learning process:

- cognitive (knowledge, theory);
- pedagogical (didactic-pedagogical technologies, organisation of the study process);
- social (interpersonal and pedagogical relations);
- innovative (transformation of knowledge and skills acquired in practice);
- research (integration of research).

Taking into account that currently the number of students studying in the study program implemented in English is currently 0, active cooperation with Liepu's Department of Foreign Relations is underway to increase the interest of potential foreign students in the study program "Intelligent technologies and mechatronics".

[1][https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course\\_Module%20Examinations.pdf](https://www.liepu.lv/uploads/dokumenti/studentiem/Regulations%20for%20Course_Module%20Examinations.pdf) - Latvian only

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

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

In the study programme "[Smart Technologies and Mechatronics](#)" internships are planned in accordance with the Liepaja University regulations on internships.[1] Internships are implemented in accordance with the internship agreement. The University concludes the internship agreement with the employer. The traineeship agreement shall include the goals and objectives of the traineeship, the planning of the traineeship, the evaluation of the traineeship, and the duties and responsibilities of the parties. The goal of the traineeship is achieved on the basis of the knowledge, skills, competences and previous work experience acquired. The rules of the internship (see Annex) have been drawn up, setting out the tasks and procedures for the internship. An example of agreement for the student placement is also attached.

The implementation of the content of the study programme "[Smart Technologies and Mechatronics](#)" respects the continuity of study courses and internships. The content of the study courses offered in the programme is oriented towards the continuous and mutually integrated acquisition of knowledge and skills in order to develop students' professional competence in various fields of engineering. The implementation of internship tasks promotes students' independence, responsibility and demonstrates their ability to apply previously acquired knowledge in a professional environment. The strategy of internship planning includes attraction of practitioners - entrepreneurs are involved in providing internships, especially employees of companies operating in the Liepaja Special Economic Zone. Before and after the placement, the suitability of the placement site for the placement is assessed.

As the program is new, students have not yet reached year 4 and graduation. During the studies, studies relevant to the industry have been realized, such as related to the development of CNC tools, the development of artificial intelligence-based prostheses for medical applications, the development of an intelligent fruit dryer, etc.

The internship is carried out in the amount of 26 CP (three internships) - Internship I (4th Semester), Internship II (6th Semester), Internship III (7th Semester), by the end of which the student has already mastered most of the theoretical study courses (see Appendix 8 for an overview of the internship planning). Placements should be chosen according to the knowledge acquired during the semester of study and this is indicated in the placement induction material. This covers all the areas in which the young professional could work after graduation. During their studies, students have the opportunity to assess their abilities and professional suitability for specific fields of work. This reduces the risk that a young professional, when starting to work independently, will find that the chosen field does not match his or her professional interests and psychological aptitude. Student surveys and discussions during internship conferences confirm that most students have already made their choice of career field during their studies, and that this choice is largely influenced by their internship experience.

The induction briefing (held one month before the start of the internship) provides students with information on the aim and objectives of the internship and the expected outcomes. Each student receives an induction material in printed or electronic form. These are presented to the traineeship

advisor before the traineeship contract is signed, and only then is the traineeship agreement signed with the head of the institution. If necessary, the student is supported in securing a placement through agreements with cooperation partners: Silkeborg Spaantagning Baltic Ltd., Trelleborg Wheel Systems Liepaja Ltd., Jensen Metal Ltd., InPass Ltd., etc.

During the internship, students observe the professional activities of the internship advisors, find out about the organisation of work in the institution, plan, conduct, analyse classes under the guidance of the internship advisor, develop lesson plans, evaluation and progress reports, as well as collect data for scientific research for their theses and bachelor theses. The progress of the traineeship is recorded in a traineeship folder. During their internship, students must comply with the Code of Ethics for Professional Practice and all relevant laws and regulations.

During the internship, the internship supervisor (Liepu teacher) communicates with both students and internship advisors to check the progress of the internship and, if necessary, provide advisory support to the student or internship advisor. Both students and placement advisors give their opinion and recommendations on the content of the placements and the knowledge and skills acquired during the theoretical studies. Traineeship advisers are invited to participate at the end of traineeship conferences.

At the final internship conference, students present what they have done during their internship, share their impressions and new skills. The final evaluation of the placement is based on a cumulative evaluation, which includes the evaluation of the public defence of the placement, the evaluation of the placement folder and the description and evaluation of the student's work by the placement advisor of the institution.

[1]<https://liepu.lv/uploads/%C4%80SD/ERASMUS%20dokumenti/Regulations%20on%20internship%20in%20Liepaja%20University.pdf>

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

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

The final theses of the students in the professional bachelor's study programme "Smart Technologies and Mechatronics" have not yet been defended.

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

### **3.3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and**

**technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples.**

Liepaja University study programme "[Smart Technologies and Mechatronics](#)" is implemented at the Faculty of Science and Engineering (FSE) within the study direction "Information Technology, Computer Engineering, Electronics, Telecommunications" in cooperation with the Institute of Natural Sciences and Innovative Technologies (DITI) and other Liepaja University institutions in a unified system (see Table 1).

**Table 1**

**Departments involved in the implementation of the study programme "[Smart Technologies and Mechatronics](#)" within the study field "Information Technology, Computer Engineering, Electronics, Telecommunications"**

<b>Units involved in the implementation of study programmes</b>	<b>Tasks in the implementation of study programmes</b>
Faculty of Science and Engineering (DIF)	<p>Provides a supportive and creative environment for quality, innovation-driven higher professional and/or academic education in science and engineering.</p> <p>Ensures the stabilisation of the Faculty's scientific potential and the achievement of quantitative and qualitative indicators in accordance with the University's criteria, systematically promoting the development of academic staff.</p> <p>Strengthens the study fields under the supervision of the Faculty, ensuring the quality of study programmes, increasing the number of students, offering new study programmes in international and national demand.</p> <p>Strengthens the public visibility of the Faculty's activities and results through targeted planning and implementation of a system of marketing activities.</p>
Faculty of Humanities and Arts (HMZF) Faculty of Pedagogy and Social Work (PSDF) Faculty of Management and Social Sciences (VSZF)	<p>The study process is ensured in cooperation with the Kurzeme Institute of Humanities (KHI), the Institute of Educational Sciences (IZI), the Institute of Management Sciences (VZI), whose aim is to promote the integration of diverse research, study and innovative activities into the study process.</p>

Natural Sciences and Innovative Technologies Institute (DITI)	DITI and its research centres (Nanomaterials Laboratory, Environmental Research Laboratory, Nature Embassy, Centre for Circular Economy) ensure the integration of research findings into the implementation of the study programme.
Board of Studies	It monitors the study programmes and the field of study, and examines and approves self-evaluation reports.

To strengthen the study base, LiepU envisages research and entrepreneurship cooperation with Liepaja University Science and Innovation Park, as well as cooperation with Kurzeme Business Incubator and Science and Innovation Park for the implementation of scientific research activities.

The study programme "[Smart Technologies and Mechatronics](#)" at Ventspils University of Applied Sciences will be implemented on the basis of the existing study direction "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science" at Ventspils University of Applied Sciences. This direction is accredited until 2023.

The study programmes at Ventspils University of Applied Sciences have been developed with the active participation of employers and all ITF graduates have the opportunity to find a job in their field of specialisation. According to the Dynamic University study, a survey of local companies in the sector shows that the demand for information technology specialists (including electronics) in Ventspils will grow by more than 500% over the next 7 years, totalling more than 700 specialists.

According to the education and career portal prakse.lv, which conducts a survey of Latvian companies, Ventspils University of Applied Sciences's Bachelor Study Programme "Computer Science" has been ranked as the sixth most recommended IT study programme in the list of the most recommended educational institutions and studies by employers in 2016, and the bachelor study programme "Electronics" as the fifth most recommended study programme for electronics engineers.

In recent years, many one-to-one discussions have been held with the heads of the leading companies in the sector, in which they listen to company's wishes. For example, VUAS management and the directors of electronics bachelor and master programmes have established close contacts with the Latvian Electrical Engineering and Electronics Industry Association (LETERA) and its board member and chairman of the board of Ventspils Elektronikas Fabrika (VEF) Ltd. - Ilmārs Osmanis. I. Osmanis, as the Chairman of the Ventspils Technology Development Council, has actively participated in all stages of the development of the Bachelor's and Master's study programmes "Electronics"; on his initiative, the courses and their content in the current programme were adjusted and adapted to the real needs of manufacturers. Since the academic year of 2013/2014 I. Osmanis is also every year the chairman of the State Examination Board of the Professional Master's study programme "Electronics".

The companies Transas Baltic Ltd., Hansa Electronics Ltd., Reids Ltd. have expressed interest in graduates of engineering studies at Ventspils University of Applied Sciences. Clients of these companies include the Latvian Navy, Latvian Border Guard, Riga Transport Fleet, Latvian Shipping, Latvian and Lithuanian fishing companies and other shipping companies in Latvia and abroad.

The material, technical and methodological provision of the study programmes corresponds to the aims and objectives of the study programme. LiepU faculties have six computer classes, which are provided with the necessary software and internet connection. The faculties have video/data projectors, interactive whiteboards and graphic projectors, which are intensively used both in

computer classrooms and other auditoriums for the demonstration of lecture and seminar materials, methodology rooms with visual and methodological materials, e-learning environment Moodle. In order to improve the quality of studies and ensure students' independent studies, lecturers receive methodological support in the preparation and placement of study materials in the Moodle environment. Students can communicate with the faculty via email, Skype, Moodle or MS Teams.

LiepU uses information systems to ensure the study process:

- Library information system “Alice”;
- E-learning environment Moodle;
- Latvian higher education information system - LAIS.

Students of the Liepaja University are provided access to the study process accounting information system of Latvian higher education institutions (hereinafter - the LAIS) during the study admission process. The information system is available on the World Wide Web at [www.lais.lv](http://www.lais.lv).

LiepU Library is the support for LiepU students and teaching staff in the study process and research. The aim of the library's activities is to ensure studies and scientific activities with printed works, electronic and other information resources, as well as to be a centre for culture promoting national and regional cultural values. A collection is made and services are provided in the Library by implementing a goal of activities.

The completion of the library's collection takes place in accordance with the necessities of study programmes, in cooperation with the teaching staff and students. In accordance with LiepU QAS procedure “A-10-II Completion of the Library's collection”, the teaching staff shall fill out the “Request for the completion of the fund to the Department of Completion and Processing of LiepU Library”. The library's collection comprises about 65 500 information resources (92% of books, 8% serial editions and other units of the collection). 75% of the entire collection is open display on shelves, so the teaching staff and students have chance to choose the most appropriate editions by themselves. If there are no necessary information resources at the Library's disposal, there are offered services for Interlibrary subscription (ILS) and International Interlibrary subscription (IILS). Successful cooperation has been established with the document delivery service SUBITO, National Library of Latvia, etc. Latvian and foreign libraries.

The library is open to users for 55 hours in a week (working days from 9:00 to 18:00 or 19:00, on Saturdays till 16:00). A visit to the library in 2019 (without pandemic restrictions): on average of 150 users per day. At users' disposal is the Subscription (handing out and receiving information resources), Copying (copying, printing, scanning and binding of works), Group discussion room (at the request of users), as well as 96 independent workplaces for studies and research in the Reading room and Library's lobby, 16 computerized workplaces with the internet connection in the Reading room of Electronic Resources. Within the library's working hours users can use the self-service machine (*Self-Check*) to receive or transfer books which is located in the Subscription. Outside the library's working hours books can be handed over to the *Book-drop box* which is located in LiepU lobby. Throughout the Library is available the free wireless internet. Since 2011, the RFID security system has been used for identifying and protecting information resources of the library.

For nearly 30 years (since 1992) Library's activities have been automatized. In the Libraries' information system ALISE are automatized librarian processes such as the processing of bibliographic data, assembling, registration of readers, handing out/receiving information units, ordering/booking, remote access to WebPack, mobile WebPAC, etc. The electronic catalogue of LiepU Library (Only in Latvian) (<https://alise.liepu.lv/Alise/en/home.aspx>) and the joint catalogue of Higher education institutions and special libraries

(<https://alise.liepu.lv/Alise/en/federatedsearch.aspx> ) are available remotely, both on computers and mobile devices. The electronic catalogue of the library provides a unified search for bibliographic information on both the collection and the local databases created. The remote access allows the user to connect from any place to the section "My Library" and follow the handing out of books, delivery deadlines, requesting an extension of the deadline, and booking or queuing the required literature.

At teaching staff and students disposal are such online databases subscribed by LiepU, such as "Letonika", "EBSCO eBooks Academic Collection", "EBSCO Academic Complete", "Cambridge Journals Online", as well as financially supported databases by MSC (Ministry of Science and Education): "ScienceDirect", "Scopus" and "Web of Science". Everyone has also the opportunity to use free-access databases made by the Library: Academic Staff publications database, Doctoral theses database and Final work database. The Library ensures training, inquiries and consultations in matters relating to the use of information resources and the use of services.

Ventspils University of Applied Sciences has prepared and regularly updates course descriptions in Latvian and English for all courses of study, as well as programme mapping to achieve the programme objectives. Based on the course descriptions, lecturers inform students about the requirements for the course grade during the first two classes of the semester.

Teaching materials prepared by the university lecturers - presentation slides, assignments, tests, control works, descriptions of laboratory works or assignments, other teaching materials are placed in VUAS electronic working environment **Moodle**. Students can upload their independent work or laboratory reports in this environment.

The VUAS library is regularly supplemented with teaching literature specified by the university lecturers.

For the academic year of 2017/2018, there are 5 computer rooms with 30-32 computers each, and one computer room with 24 workstations adapted to the engineering research work streams - mathematical modelling and CAD/CAM training. All classrooms are equipped with computers and projectors. The total number of computers in the University network is around 300. All the University's computers are connected to a single network. In addition, wireless internet is available in the University and in the dormitories.

The library of Ventspils University of Applied Sciences has a collection of ~26,000 volumes of books and ~750 audiovisual materials (CD, DVD, CD-ROM, audio and videocassettes) in mathematics, physics, computer science, electronics, management, economics, law, philosophy, psychology, linguistics, translation studies, literary studies, etc.). For the Computer Science and Electronics programmes (both Bachelor and Master programmes), there are 1402 printed books and 515 diploma papers available. Subscriptions to printed publications are used to support the study programme: Energy and the World; Latvian Journal of Physics and Technical Sciences.

All the library's titles are recorded in a single electronic catalogue, and reader service is automated. The system called ALISE automates all areas of the library's activities, including the possibility to publish the library's catalogues on the Internet, as well as to access other libraries' catalogues via network. To ensure the full potential of studies, the library's holdings are systematically updated with the latest world-renowned and authoritative academic and scientific literature, as well as periodicals. Appropriate educational, scientific and reference literature in Latvian is also purchased. The library's acquisitions are adjusted by the library advisory board, in which the university's lecturers actively participate, using the latest publishers' advertising catalogues and internet possibilities. The ITF budget allocates around EUR 1,000 each year to replenish the textbooks needed for the field of study. The following databases are available free of charge to users of the

VUAS computer network:

- EBSCO;
- Britannica Online Academic Edition;
- RUBRICON;
- NAIS;
- Latvian National Digital Library;
- LETA;
- Letonika reference and translation system;
- Lursoft - newspaper library; data bases of companies;
- lv.

Within the project "Establishment of a unified core network of national importance for the support of scientific activities in Latvia", access to the Science Direct and Scopus and Web of knowledge databases has been provided. Since April 2014, students, researchers and academics can use the IEEE Electronics Engineering Database for free at the RTU Ventspils branch library.

Services offered by the Ventspils University of Applied Sciences Library:

- Subscribed databases;
- CD-ROM databases;
- 8 computers with internet connection;
- Group and individual information literacy sessions;
- Use of the e-book reader in the library;
- Booking expenses, extending the book handling in deadline;
- A quiet reading room equipped with the necessary equipment for private lessons (audio and video equipment and a computer with internet access);
- Copying, computer printing;
- Kurzeme virtual catalogue;
- Night subscriptions, holiday and outgoing day subscription;
- Periodicals (newspapers, magazines, etc.);
- Interlibrary loan- Reference, consultation;
- Thematic lectures (events).

The library has 100 seats.

## **Material and technical base**

### ***Liepaja University***

LiepU material and technical base is available for both students and University teachers. Since the study programme is interdisciplinary, it is necessary to use the material and technical support of all faculties for the study programmes implemented at LiepU:

- 320 computers (80 of which are less than 3 years old);
- video projectors - 23;
- interactive whiteboards - 7;
- copiers - 6;
- photo cameras, video cameras - 18 (11 photo cameras, 7 video cameras).

Students have access to a free wireless network in each of the study blocks (36 wireless access points in total). A workstation virtualisation solution has been implemented and three computer classes are equipped with workstation clients (63 workstations in total). Students have their own virtual computer, which is not connected to their workplace. This solution ensures the mobility and security of the study process. Modern network hardware has been installed to virtualise the

computer network and a CAMPUS computer network connection has been established between all study blocks. A cooperation agreement has been signed with Microsoft for the lease of MS Office and MS Windows software licences, which can be used by lecturers both in the implementation of the teaching process and in the production of teaching materials. Within this cooperation agreement, both LiepU lecturers and students have access to MS Office 365, 1Tb file archive in the cloud, etc. at no extra charge.

On 2019, the Faculty has installed a Raspberry Pi microcomputer classroom (12+1 workstations), purchased 15 Arduino microcontroller and sensor kits, a WAGO professional PLC controller and sensor kit, RPi cameras, data transmission modules, displays, mock-up boards, self-driving robots and other equipment for Internet of Things (IoT), Robot Control, PLC controller programming courses.

### ***Equipment of the Institute of Natural Sciences and Innovative Technologies (DITI)***

The Institute has the following equipment:

- Foaming equipment:
  - high vacuum chamber
  - possibility to heat the tray up to 600°C
  - control of the thickness and speed of application
- three different steamers:
  - magnetron - electron flow with 6 material slots
  - resistive steamer
  - vaporiser for organic substances
  - the possibility to process the sample in a vacuum chamber with a laser
  - possibility to work with different masks
  - manufacturer - Angström, Canada
- CVD - chemical vapour deposition
  - for the production of graphene by gas deposition
  - possibility to heat the sample up to 1700°C
  - the ability to dose gases precisely:
    - H<sub>2</sub> - hydrogen
    - CH<sub>4</sub> - methane
    - Ar - argon - an inert gas, serves as a carrier
  - assembled in Latvia, stove Norberthem, Germany
- Pulsed laser
  - energy per pulse - 100 mJ (millijoules)
  - wavelength 680 to 1064 μm (micrometres)
- Electron microscope
  - increase up to 30,000 times
- Solar collector
  - maximum heat output 1 kW
- Solar photovoltaic generator
  - 6 panels, voltage of each is 36 V
  - total maximum power 2 kW
  - voltage, frequency stabiliser (230 V, 50 Hz)
- Bioreactors
  - volume 2.5 m<sup>3</sup>
  - temperature automatically controlled, range (10°C - 70°C)
  - automatically controlled pH control
  - 2 peristaltic pumps for acid, alkali

- mixing system with automatic control
- methane content and gas volume monitoring system with data storage function

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

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

The funding of studies from the state budget is allocated each calendar year in accordance with the Cabinet of Ministers' Regulation No 994 of 12.12.2006. "Procedures for financing higher education institutions and colleges from state budget funds" and the agreement between the Ministry of Education and Science and the Liepaja University on the training of a certain number of specialists. The calculation of the projected costs of the professional bachelor study programme "Smart technologies and Mechatronics" for full-time study for the period 2021-2022 is based on the base costs for 2021 (EUR 1,630.11 per one study place) and the coefficient of the thematic area of education "Engineering science" established by the Ministry of Education and Science: 1.7, as well as the cost coefficient for professional bachelor-level study programmes: 1.0 The cost per study place in 2022 is EUR 2 771.19.

The approved tuition fee for full-time study for the first year of the academic year 2022/2023 is EUR 2,220 (in English - EUR 2,700) and it is fixed for the whole study period, the total tuition fee for 4 years is EUR 8,880 (in English - EUR 10,800). Minimum number of students per course for full-time study: 12 students.

Since 2012, in the budget of Liepaja University of Applied Sciences there has been established a budget for the development and implementation of study programmes. The budget is planned and used for organising students' learning processes outside the university, for upgrading the material and technical base of the programmes (including laboratories), for recruiting qualified staff, etc.

A faculty science budget has been established to support the research (creative) activities of academic staff. The budget is planned and used for conference fees, travel expenses, organisation of scientific and methodological seminars, development of international cooperation, attraction of guest speakers, etc.

Liepaja City Municipality funding is available for attracting academic staff to ensure the quality of studies.

The use of DIF funding is regularly reviewed at meetings of the Faculty Council and the teaching

staff, and at meetings of the Senate Budget and Development Committee.

LiepU has established quality management system procedures that support the study process - personnel management, financial management, IT, library and economic resources management, document management, project management, information circulation and public information management, as well as scientific and research management processes. For example, A-2-1 "Basic Budget Planning", A-2-2 "Basic Budget Execution and Control".

### 3.4. Teaching Staff

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

The composition of the University lecturers working in the study programme "Smart technologies and Mechatronics" complies with the Law on Higher Education Institutions and the Cabinet of Ministers Regulation No. 512. The qualifications of the academic staff involved in the implementation of the study programme are appropriate to the specifics of the study programme and the conditions of its implementation, as well as to the requirements of regulatory enactments in the field of engineering sciences.

University teachers are professionals in their field, who have demonstrated their expertise in research and the use of e-environments in the study process, as well as participating in international projects and developing teaching tools and materials. The study programme also involves professionals in their specialities with practical work experience in their field - mainly in courses related to engineering, design, materials science.

The staff involved in the implementation of the study programme are listed in Annex 11, indicating the academic degree and/or professional qualification of the staff member, the position held, the study courses implemented.

As the list of staff involved in the implementation of the study programme shows, the implementation of the study programme involves faculty members and guest lecturers from several LiepU faculties, 24 faculty members in total, 11 of whom have Doctoral degrees (46%), and 13 - with Master's degrees (54%). 2 are guest lecturers (8% of the total number of lecturers in the programme).

There are 15 elected faculty members (63%) and 9 non-elected faculty members (37%) involved in the implementation of the study programme. Of the 15 elected faculty members, 4 are professors (27%) and 5 are associate professors (33%, all with PhDs in various fields).

There are 4 faculty members involved in the implementation of the study programme at VUAS - 1 with a PhD degree (25%) and 3 with a Master's degree (75%), of whom 2 are lecturers (50%) and 2

assistant professors (50%), 2 elected (50%) and 2 non-elected (50%).

The results of the academic staff's scientific and creative activities are in accordance with the Cabinet of Ministers' Regulations No. 795 (11 December 2018) on Licensing of Study Programmes (i.e. No. 59 59. §), regarding the required qualitative indicators for the academic staff assigned to the field of study. Annex 11 contains a list of all the faculty members who are planned to be involved in the implementation of the study programme, as well as their creative and scientific biographies (see Annex 11A, attached in a separate file). The list of scientific publications of teaching staff in peer-reviewed journals, published teaching aids, research projects and list of artistic creativity achievements that characterise the professional competence of the academic staff involved in the field of study in the provision of taught study courses is attached as Annex 11B. Annexes 11A and 11B are attached in a separate file.

Since all faculties of LiepU are involved in the implementation of the study programme, the areas of scientific research are also broad, e.g., Humanities, Mathematics, Technologies, Natural Sciences, as well as Social Sciences. Scientific researches in highly ranked databases Web of Science and SCOPUS have been published both by LiepU researchers and academic staff, e.g., A. Jansone, Š. Guseinovs, J. Kaupužs, V. Frišfelds, D. Kūma, U. Žaimis, etc.

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

Due to the short duration of the programme, there have been no major changes in the composition of the teaching staff. The only adjustment was the vaccination requirement during the Covid-19 pandemic, when some teachers had to be replaced by others with equivalent training and experience.

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

#### **3.4.4. Information on the participation of the academic staff, involved in the implementation of the doctoral study programme, in scientific projects as project managers or prime contractors/ subproject managers/ leading researchers by specifying the name of the relevant project, as well as the source and the amount of the funding.**

### **Provide information on the reporting period (if applicable).**

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

The teaching staff employed in the study programme cooperate in the development of the content of both the professional specialisation and theoretical courses in the field of study and in the exchange of information on current developments in the field and in the study process. Most courses and modules are designed with several lecturers per course, working on a shared workload, which improves the exchange of information within the course and increases the possibilities to cover for each other in case of illness, travel or other unforeseen circumstances.

The faculty members employed in the study programme cooperate in the development and implementation of joint research and projects within the LiepU Institute of Natural Sciences and Innovative Technologies, in the exchange of information on current events in the field - by meeting at various exhibitions, events, international conferences, seminars and other networking events held within the field. Information exchange is ensured by regular meetings of the teaching staff at meetings organised by the Faculty and meetings within the framework of research activities at scientific institutes.

LiepU faculty qualification improvement is carried out in accordance with the LiepU Academic Staff Development Plan for the year of 2018-2022 (approved 17.05.2018, amended 26.09.2018). The plan is linked to projects under the European Union's Structural and Cohesion Funds for the 2014-2020 programming period, the European Social Fund and the European Regional Development Fund's Operational Programme "Growth and Employment":

- 2.1 specific support goal "To reduce fragmentation of study programmes and to strengthen resource sharing";
- 2.2 specific support goal "To strengthen academic staff in higher education institutions in areas of strategic specialisation";
- 2.3 specific support goal "To ensure better governance in higher education institutions".

Upgrading is planned in the following areas:

- academic staff internships to improve the qualifications of academic staff in cooperation with Latvian businesses and educational institutions in the Baltic States. The activities to be carried out during the traineeship are planned to be related to the subject matter of the taught study course. The companies/institutions targeted for traineeships are prioritised those whose activities include innovation, research and technological development. The selected companies/institutions are open to cooperation, with local and international experience, and aim to be recognised in the sector in the region, the Baltics and worldwide. The choice of educational institutions for traineeships focuses on the ability to meet the needs of the strategic areas of specialisation. As the Baltic Resolution adopted by the Baltic Assembly in 2016 aims to intensify cooperation between the three Baltic States, traineeships

for academic staff are planned in Latvian, Lithuanian and Estonian educational institutions and cooperation will be based on partnership and the principle of learning by doing and doing to learn, with the active participation of University lecturers.

- mobility activities for academic staff to improve their qualifications are carried out in the framework of *Erasmus+* mobility and projects. LiepU of Applied Sciences provides for 13-15 University lecturer mobilities each year.
- development of academic staff competences aimed at ensuring the core activities of LiepU - quality study content, scientific research or implementation of artistic creativity. Competence development of academic staff is carried out in accordance with the Scientific Strategy of the Scientific Institution "Liepaja University" for the year of 2015-2020 and the Liepaja University Regulations "Regulations on Elections to Academic Positions", which define the requirements for a candidate for an academic position and confirms the academic and professional qualifications in accordance with the requirements of the field of science and arts for both study and research work.

The existing education and competence of the programme's lecturers is supplemented by practice, as well as by acquiring new knowledge, as far as possible, by raising their educational level, attending courses, seminars, conferences, congresses, forums, participating in *Erasmus+* mobility events and other experience exchange activities. LiepU provides *Erasmus+* mobility for 13-15 University lecturers every year.

At the time of submission of the self-assessment report, the Professional Bachelor's study programme "Information Technology" involves 28 University teachers for 11 students.

# Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Diploma_diploma_suppl_sample_SmartTehn_ENG.pdf	Diploma_Diplona_pielikumu_paraugi_ViedTehnMeh_LV.pdf
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)	APPENDIX 2 (1).docx	2_pielikums (1).docx
Statistics on the students in the reporting period	Statistika_EN.docx	Statistika_LV.docx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	ANNEX 3.docx	3_pielikums.docx
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)	ANNEX 4.docx	4_pielikums.docx
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	Annex 8.docx	8_pielikums.docx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	ViedasTehnologijasUnMehatronika_TipveidaPlans_LV_EN.xlsx	ViedasTehnologijasUnMehatronika_TipveidaPlans_LV_EN.xlsx
Descriptions of the study courses/ modules	10_pielikums_kursu_apraksti_Btvm_ENG.pdf	10_pielikums_kursu_apraksti_Btvm_LV.pdf
Description of the organisation of the internship of the students (if applicable)	Regulations on intership in Liepaja University (1).doc	Noteikumi par praksi LiepU (2).docx
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		