

# Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: Riga Technical University

Study field: Manufacture and Processing

Experts:

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## Summary Assessment of the Study Field

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Riga Technical University (RTU) implements 4 study programmes in the study field "Manufacture and Processing": Bachelor programme "Clothing and Textile Technology" - 42542, Bachelor programme "Material Technology and Design" - 42548, Master programme "Design Engineering" - 47548, Doctor programme "Fibre Materials Science" - 51548.

After getting acquainted with the self-assessment report (SAR) and supplemented documents, as well as the materials and the information obtained during the on-site visit, the experts have concluded that the study field is partially compliant with the requirements since insignificant shortcomings and deficiencies have been identified and they can be eliminated within the accreditation term of the study field. Most of the shortcomings are related to a low level of mobility and modest internationalization (in terms of academic staff), insufficient level of cooperation with the private sector with the purpose of consultation of the content of the study programmes. These shortcomings do not affect the overall quality of the study field. Although in general RTU has developed and operates a quality system at the management level, in the study field it would be necessary to promote cooperation among the field and programme management with the academic staff and students. The disadvantage of study programmes is the technical equipment of laboratories and workshops that needs to be improved to meet the new requirements of today's industry (both woodworking and textiles). RTU does not need to stop on a current technical level. Future technical improvements should be directed towards the digitization and automation of processes, the current level is sufficient to produce models at the bachelor's and partly master's level. CNC - both- in woodworking and sawing. The RTU library also offers e-sources with 20 databases and pilot databases to which experts do not have an access.

Positive aspects: 1. The goals of the study field "Manufacture and Processing" are clearly defined and achievable. They correspond to the overall strategic development of RTU. 2. Three-level study cycle is implemented in the study field. 3. The field of study generally meets the needs and development trends of the society and the national economy. 4. RTU Quality Policy is aligned with the European Association for Quality Assurance in Higher Education (ENQA) standards and guidelines. 5. Study field is located in a renovated, modern building with a well-developed internal and external infrastructure and scientific laboratories, equipped with quality computers and product design software, AutoCAD, SolidWorks. 6. Faculty members take advantage of internships in companies in the sector, as well as opportunities offered by various research and study projects, such as the ESF, ERDF, Erasmus, Nordplus, etc. 7. Active support of the university to foster research activities. At the university level, there are many research support tools. 8. The increasing number of product and technology development research projects. 9. The study field has developed very close relationships with the local industry. 10. A robust, very well-organized internship scheme is in place.

The graduates of the study programmes of the study field are very well respected in the local industry. Many organizations base their competitive advantage on the skills and knowledge of the study field graduates.

Negative aspects: 1. Graduate follow up and feedback mechanisms could be stronger and more widely used for improvement and development of the study field. 2. Reverse feedback mechanism to the students about programme/course changes could be strengthened. 3. There is an error in the so-called top to down communication - the academic staff members are not informed about the KPI of their institute. 4. The RTU Quality policy and the related regulations are not available publicly in English, only in Latvian. 5. The share of external income in the amount of funding for the study field

is very small. 6. Incoming mobilities are dominated by the post-Soviet countries: Lithuania, Russia and Romania. 7. There are some agreements with international organizations and universities leading to joint publications. Those corporations should be strengthened more to get tangible results such as product and process innovations.

## **1. Management of the Study Field**

### **Analysis**

RTU is a state-founded higher education institution and is the oldest technical university in the Baltic States. The aims of the study field (to provide competitive, scientific research-based, multi-level education to students) are clearly defined (SAR, p.20), attainable and comply with the RTU strategic goals: excellent science, high-quality studies, sustainable valorisation, institutional excellence (SAR, p.21);

[https://www.rtu.lv/writable/public\\_files/RTU\\_strategy\\_for\\_2120\\_2025\\_makets\\_26.10.2021\\_eng.pdf](https://www.rtu.lv/writable/public_files/RTU_strategy_for_2120_2025_makets_26.10.2021_eng.pdf) ). During the visit, the experts made sure that the study field comply with the main directions of the strategic development of the RTU.

The Evaluated study field comprises the four study programmes – two professional bachelor study programmes “Clothing and Textile Technology” and “Material Technology and Design”, one professional master study programme “Design Engineering” and one Doctoral study programme “Fibre Materials Science”. A three-level study cycle is implemented in the study field, which ensures succession so that students can effectively continue the study process and improve their knowledge, skills and competencies.

Since the 2020/2021 academic year, two professional master's study programs "Clothing and Textile Technology" and "Material Design and Technologies" have been reorganized and replaced by one master's study programme “Design Engineering” (SAR, p.259). The new study programme is organized with modules that allow optimizing resources, as all students start their studies together, but later they can choose one of the specializations. During the visit, the experts were informed that academic staff and students were involved in the process, and entrepreneurs confirmed the content of the final version of the new study programme. However, during the visit, the experts received information that the software acquired during the studies was not coordinated with the one used in the industry (for instance, CAMSuite, PreCAM).

The Doctoral study programme “Clothing and Textile Technology” title has been changed to “Fibre Materials Science”. During the visit, the experts were informed that the internal discussions at various levels on these changes lasted a year and a half before the decision was taken. These changes secure the mutual link of the PhD study programme with the sub-fields of the materials science and admission requirements (SAR, p.149).

According to the SAR (p.15) and during the meeting experts made sure that the graduates of the study field are working as new product developers, designers, owners of their own companies, scientists. During the meeting, the entrepreneurs confirmed that the students are very motivated, thorough, very professional and have sufficient basic skills in their profession.

Graduates can easily find their jobs because manufacturing companies need these professionals. However, even very often, when students start an internship, companies offer them a job and then and after a while students decide to continue working instead of completing their studies. This is the reason why the graduation rate is only 60-70% of 4th-year students. These changes correspond with the development trends of the economy as graduates are highly demanded.

According to SAR p.25. and annexe No.4, The management of the study field and study programmes is clearly set up, being provided by the Council of the Faculty of Materials Science and Applied Chemistry (hereinafter – FMSAC) (SAR, p.25). During the site visit, experts made sure that management processes are top-down and also bottom-up. RTU organizes a survey of students to

assess the level of student satisfaction, as well as to understand the real situation and all the necessary to improve the content of the study course.

According to the SAR and the information received during the visit, the field of study has close cooperation with the industry. Representatives of the industry participate in various decision-making bodies, such as the Advisory Board, the Study Direction Committee, participate in the review of final theses, provide research topics to students and researchers, jointly participate in the development of new products, and offer internships. RTU has a formal agreement with some companies, but close cooperation is being established also with other companies without a formal agreement. There isn't an official partnership in RTU advisory bodies. At present, cooperation with industry can be characterized at the level of individual academic staff, not so often at the level of the general field of study.

The management of the study field and study programmes is clearly established, it is ensured by the Study Field Commission, which consists of the Director of the Study field, Deputy Director, Head of study programmes, experts and specialists of the relevant scientific disciplines, leading academic staff, and students' self - government representatives (SAR, Annex Nr.4). Due to changes in the study field since the last accreditation, for instance, the specialization "Design and technology of leather items" was closed in the Bachelor study programme "Material Technology and Design", the master's study programme "Design Engineering" was launched on the basis of two professional Master's study programmes "Clothing and Textile Technology" and "Material Design and Technology", the title of the doctoral study programme was changed from "Clothing and Textile Technology" to "Fiber Materials Science", experts believe that it testifies to the development-oriented management of the study field.

During the visit, the experts were convinced that the evaluation of study programmes is carried out regularly, thus appropriate adjustments are made to the study courses based on student feedback and changes in the labour market, to significantly facilitate students' integration into the labour market. But it is also necessary to organize more practical work for students because it will be very useful.

The study programmes offered in the study field meet the requirements of the labor market, as they not only prepare the specialists necessary for the industry, but also implement research that is important for the industry.

During the visit, the experts were also able to make sure that academic staff, administrative staff, and technical staff work as one team.

During the visit, the experts made sure that the study field received all necessary technical support, for instance, record keeping, IT service.

According to the information available on the RTU website (13.11.2021.) and described in SAR (p.26-28.), RTU has established a clear system and procedures for the admission of students. All information is available on the RTU website in both languages – Latvian and English. The admission process and procedure of student enrolment are set at the RTU Admission Regulations, based on the Law on Higher Education Institutions and Regulations of the Cabinet of Ministers Nr. 846 issued 10 Oct 2006 "Regulations on Requirements, Criteria, and Procedures for Enrolment in Study Programmes". In addition, the institutional Admission Regulations are approved by the RTU Senate and published annually, on November 1. In SAR (p. 26-27) the centralized examination system is clearly described, as well as the two ways to apply for the state budget-funded seats in undergraduate study programmes. Admission requirements for each study programme are described in the SAR of each study programme.

Recognition of previously acquired formal and non-formal education at RTU is set at the internal regulation "Regulation on the Recognition of the Courses Completed at Other Universities and RTU Study Programmes" (2016) and the "Procedure for Recognition of Competencies Developed Outside Formal Education of From Professional Experience and Learning Outcomes Achieved in Previous Education at RTU" (2019). In addition, according to SAR (p. 29), recognition, depending on the

situation, is performed by the director of the study programme or by the member of academic staff responsible for the study course.

The assessment system is complex, summative. Assessment of student learning outcomes is carried out in accordance with the "Regulation on the Assessment of Learning Outcomes" (SAR, p.30). The final grade is made up of several components and academic staff inform students about assessment criteria at the first lecture. During the visit, the experts were able to get acquainted with the ORTUS system, in which students have access to all the necessary information about the content of study courses, study materials, assessment procedures, and important deadlines. During the visit, the experts made sure that the students were informed about the students' rights and obligations, about the opportunities and ways of solving the problems, about the possible financial support for research, about the procedure for providing internships.

The RTU has set certain academic integrity principles and mechanisms, and it uses appropriate plagiarism detection tools which are effective and contribute to the development of the internal culture of the RTU and the stakeholders are aware of such tools and mechanisms. RTU has internal regulations "The Research Code of Ethics" (since 1997) and "Academic Integrity Code" (since 2016). Each graduation paper is checked in two systems – joint computerized plagiarism control system (JCPCS) and Turnitin® in parallel. RTU also is a member and one of the founders of the European Network for Academic Integrity (ENAI).

The official home page of RTU is available at [www.rtu.lv](http://www.rtu.lv) (viewed: 17.11.2021) On the home page separately, in the section "Studies", it is possible to choose the study level, then the study programme. The information available on the official website corresponds to the information available in the official registers. Analogous information is available in both Latvian and English (only for programmes offered in English). General information about all study programmes is available about the programme, programme content, degree awarded, academic volume, duration, the language of study, career opportunities, study opportunities, tuition fees. Admission information is organized differently in Latvian and English. All admission requirements can be seen directly in English compared to Latvian. There is another website in Latvian with information about admission in general, not only in the programmes of evaluated study field.

## **Conclusions. Strengths and weaknesses**

The aims of the study field are clearly defined, attainable and comply with the RTU strategic goals: excellent science, high-quality studies, sustainable valorisation. The assessed study field consists of four study programmes and a three-level study cycle is implemented in the study field, which ensures succession so that students can effectively continue the study process and improve their knowledge, skills and competencies. The students are very motivated, thorough, very professional and have sufficient basic skills in their profession. Graduates can easily find jobs because manufacturing companies need these professionals, they are highly demanded. The management of the study field and study programmes is clearly set up, being provided by the Council of the FMSAC. It is ensured by the Study Field Commission and the management processes are top-down and also bottom-up. The management of the study field is development-oriented. Cooperation with industry can be characterized at the level of individual academic staff, not so often at the level of the general field of study. During the visit, the experts were convinced that the evaluation of study programmes is carried out regularly, thus appropriate adjustments are made to the study courses based on student feedback and changes in the labour market, to significantly facilitate students' integration into the labour market. But it is also necessary to organize more practical work for students because it will be very useful. RTU has established a clear system and procedures for the admission of students. All information is available on the RTU website in both languages – Latvian and English. The assessment system is complex, summative and the students were informed about the students' rights and obligations, about the opportunities and ways of solving the problems, about the possible

financial support for research, about the procedure for providing internships. The RTU has set certain academic integrity principles and mechanisms, and it uses appropriate plagiarism detection tools which are effective and contribute to the development of the internal culture of the RTU and the stakeholders are aware of such tools and mechanisms. The information available on the official website corresponds to the information available in the official registers.

#### Strengths:

1. Three-level study cycle is implemented in the study field.
2. Highly motivated students with good basic knowledge and skills in their profession.
3. The field of study generally meets the needs and development trends of the society and the national economy.
4. Recent changes in study programmes can be considered as evidence of continuous study management.
5. A system of evaluation procedures for student achievements and study results has been established.
6. All final theses are evaluated in two parallel plagiarism systems.
7. The information published on the RTU website about the respective study programmes corresponds to the information available in the official registers.

#### Weaknesses:

1. It is necessary to organize more practical creative work for students during study courses.

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

### **Analysis**

RTU has established an internal quality management system, which works in line with the RTU Excellence approach as well as the RTU Quality Policy (SAR, p.9-10). Both of these documents are publicly available online. RTU Quality Policy lays out the framework and pathways for development and improvements of the RTU Strategy, research, study process and organization and is aligned with the European Association for Quality Assurance in Higher Education (ENQA) standards and guidelines (SAR, p.9). The RTU Excellence Approach and quality policy are mutually integrated documents that require RTU to use the quality model of the European Foundation for Quality Management (EFQM) (SAR, p.9).

RTU quality policy and its implementation are based on the following principles (RTU Quality Policy, [https://www.rtu.lv/writable/public\\_files/RTU\\_quality\\_policy\\_of\\_rtu.pdf](https://www.rtu.lv/writable/public_files/RTU_quality_policy_of_rtu.pdf)):

- Activities aimed at national sustainable development.
- Leadership and unity in the achievement of the aims.
- Systemic and process-oriented approach.
- Continuous, developmental improvement.
- Fact-based approach to decision making.
- Cooperation with partners.
- Personnel involvement and competency.
- Process analysis and management.
- Risk and opportunity management.

Collecting the information found in SAR, as well as during the on-site visit, experts have concluded that by maintaining the principles defined in the current RTU Quality Policy, the aims and learning outcomes in the study field and its programmes are being achieved. By creating links between all of the parties involved in ensuring the quality assurance system - student representatives, partners, professional associations, student organizations, other higher education institutions, businesses and

organizations, academic staff and graduates, RTU has ensured continuous development mechanisms, which were also evidenced by the experts during the on-site visit (SAR, p.10). Each year the quality assurance system is developed, even more, involving key stakeholders, internal RTU staff, students and other stakeholders - the vast review is given once per year, where more than 200 indicators are reviewed and changed if necessary, however, it was noted during the visit that the improvement and development of the RTU Quality Policy is an ongoing process and problems are being dealt with in "real-time". For example, as the survey cycles end, the employees of the RTU Department of Quality Management review the complaints found and they are analysed and dealt with. An example is given with complaints about academic staff's English language - if such a problem has been noted, the academic staff member in question is obliged to take extra English courses provided by the university. Another problem situation is given as an example regarding the ERQM excellence model, which at the moment is integrated into each level of university and the quality assurance system. Difficulties were found on how to structure the model for the university processes (as it is usually meant for businesses), regarding external stakeholders (employers, industry, partner universities). That was an issue a couple of years ago, now the indicators are in place. Potential problems were identified and suggestions for improvement of RTU Quality Policy, including improvement of academic quality, were made at the meetings of a working group. In one year, the working group considered compliance to nine criteria of the EFQM model and analysed 101 sub-criteria, having identified 133 problems in total and having made 14 suggestions. The priority problems were included in the RTU Development Plan as tasks set for a definite term to be solved by the respective organizational units. A quality model review report is drawn up concerning the Quality System, which identifies the areas that should be improved. Performance indicators and results of student polling are integrated into RTU Quality System (SAR, p. 34).

During the on-site visit, the experts didn't find any evidence that academic staff members (who are not directly involved in management level) are aware of the key performance indicators (KPI) of their institute. The expert group views this as a point for improvement as for continuous development all of the involved parties should be aware of the related KPI.

RTU has developed a procedure for the development, approval and supervision of the study programmes - "Approval of the new version of the Procedure of Application, Development and Amendment of Study Programmes" (SAR, List of the main normative acts and regulations, Appendix 06). All of the procedures defined are clear and logical. Each faculty in the RTU, as well as the institute, seem to have its advisory board from the industry, however, the experts did not see any tangible proof of that during the on-site visit. It is mandatory in RTU to have an expert from the industry on the Committee of the Study Direction. The proposal for changes in a programme or study course can come from either side - student self-government, surveys, industry. Any proposed developments of a study programme are examined and approved by the Committee of the Study Direction. The evidence of this consecutive procedure being established was also found during the on-site visit by the expert group.

Feedback from the involved parties is collected periodically and is inclusive of students, employers, academic staff and graduates. Student surveys are regulated through "Regulation on the Student Surveys Used in Assessment of the Educational Process" (SAR, List of the main normative acts and regulations, Appendix 20). Although this regulation is logical and clear, it does not seem to be available publicly (on the website) in English as well as the whole section about quality assurance policies in RTU is only available in Latvian. RTU organizes a survey of students twice a semester to assess the level of student satisfaction, as well as to understand the real situation and needs to improve the content of the study course. Such an approach can help to assess the situation also in the middle of the semester, and if a problem is identified, the situation can be improved before the end of the study course. However, during the visit, the experts concluded that a relatively small number of students participate in these surveys, which indicates that the data obtained are not representative. During the visit, it was disclosed that the average percentage of students who fill in

the surveys is 40-50% on average, but it was also said in other talks that there are some courses for which the percentage is around 10-15%. At the same time, in parallel with surveys, an informal discussion is very often used as a method of identifying problems. Experts believe that the combination of these two methods provides an opportunity to identify problems, eliminate them on time, as well as the opportunity for students to express their views, which is also considered as far as possible. An example was given from different involved parties regarding the merging of the two MSc programmes before the creation of one - Design Engineering. 2 years ago different stakeholders, including students and academic staff members were interviewed and their opinion was taken into account.

Annual polling of Doctoral students and Doctoral alumni has been introduced, it is also planned to conduct surveys of Doctoral entrants. The polling on the admission procedure and study process has been launched. The summaries of results are published on the ORTUS portal. The results are taken into consideration in the improvement of the Doctoral study process and the quality of support provided to doctoral students (SAR, p. 36).

Academic and RTU staff occasionally and individually post the summary of the surveys on the ORTUS platform, however, for the courses with a low participation rate it was said that there was no point in that because no statistically reliable data was produced from the surveys. A reverse feedback mechanism from the management and academic staff to the students about the changes made based on the summary of the surveys seems to not have been established. There are several mechanisms in place with which the feedback is collected from the employers, such as surveys after the internships have ended and RTU Council Convention. It is also planned to launch a centralized polling mechanism for employers outside the internship surveys. Graduate surveys are collected after every graduation round, however, no feedback or follow up mechanism seems to be established afterwards. Only a couple of graduates during the visit remembered the survey or said that they filled it in. RTU Alumni Association helps with the feedback mechanism and seems to be active on the online platforms available, however from the visit experts deduced that the association is more of a social tool, not one to provide valuable feedback about the study field and the programmes within it.

RTU collects and analyzes data annually in the form of a quality review, summarizing previously defined KPIs. Performance indicators characterize the quality of entrant enrolment process, study process planning and the quality of implementation of studies - implementation of the initial admission plan, number of matriculated entrants vs. number of entry applications, number of graduates vs. total number of students etc (SAR, p.40). It is emphasized that the KPIs tend to define principles more describing quality, less - quantity. The data from the quality review is submitted to RTU administration and analysed by the study programme, as well as the study field. There is an agreement in place every year between the institute and the Rector of RTU about specifics of the performance indicators. If these performance indicators are not met in the annual RTU quality reviews, the institute loses the specific "performance funding". The indicators are not only supposed to be reached within the institute but are also compared with the overall RTU level. The RTU Study Department then organizes further review, forwarding data to the faculties/institutes and study programme directors, who initialize the necessary improvements (SAR, p.40). Changes to the approved processes occur in cooperation with quality management specialists. Summarized statistics on student/graduate numbers, as well as the quality indicators are used to improve the study field - by allocation of state-funded places for students, programme review and development. For example, if a member of academic staff gets less than 75% evaluation in any of the criteria in student feedback surveys, they are obliged to pay more attention to this issue in hand and review this criterion regarding the implementation in this study course.

For better visualization and analysis of statistical data, it is planned to develop and improve a tool in the Power BI environment, which will make the reviews more comparative (SAR, p.40).

RTU has specified the standards outlined in Part 1 of the ESG which require special attention. As it is



mentioned in the analysis above, there are improvements needed for informing students and academic staff members about the mission and vision of RTU defined in the quality policy, as well as the KPIs. In the context of student-centred learning, teaching and assessment, RTU has established the Centre of Academic Excellence, which acts as a bridge between teaching and different learning cultures (SAR, p.42). One of the challenges also is the relatively low activity of local students in using exchange programmes for studies abroad. It is said in the SAR that to compensate for this, RTU promotes international opportunities by inviting guest lecturers and conducting study courses with foreign students. According to the information received by the experts after the visit during the last 3 years there have been 3 visiting lecturers working for the institute for a half a year. 1 visiting lecturer for the whole year (Annex "Pielikums\_faktu\_kludu\_labojums\_ENG\_1.2"). However, during the meetings with students and graduates, they expressed an opinion that more guest lecturers would be an improvement, therefore a further plan strengthening foreign guest lecturer income might be beneficial for internationalization and the students. During the on-site visit it was said that the internationalization strategy is not directly part of the quality assurance system, but rather a part of each department's strategy, nevertheless, they are all interlinked. Overall it seems that RTU has analyzed the ESG standards that could be improved and for most of them they have a plan in place on how to tackle the problem.

### **Conclusions. Strengths and weaknesses**

Experts have observed that the procedures and principles defined in the RTU Quality Policy are in place, are coherent and overall oriented to continuous improvement and development, however, some improvements might be in place (please see weaknesses and recommendations for the study field). RTU has developed a procedure for the development, approval and supervision of the study programmes, which involves the relevant feedback mechanisms, at the same time, graduate feedback might be used more efficiently. RTU collects and analyzes statistical data of the relevant study programmes annually and consistently, examples are given on how the data is used to improve the study field and the programmes within. RTU has analysed the ESG standards that could be improved.

#### **Strengths:**

1. The higher education institution/ college has established a quality policy (which is publicly available). The higher education institution/ college has developed and maintains a quality assurance system, which contributes to the achievement of the aims and learning outcomes of the study field and the relevant study programmes. The system ensures continuous improvement, development, and efficient performance of the study field and the relevant study programmes.
2. The procedures for the development and review of the relevant study programmes of the study field and the feedback mechanisms (including feedbacks to students, employers, and graduates) have been defined and they are logical, efficient and available for all stakeholders.
3. The higher education institution/ college collects and analyses the information (statistics) on the relevant study programmes of the study field regularly and efficiently uses it to improve the study field.
4. The higher education institution/ college has identified the standards outlined in Part 1 of the ESG, which require special attention. To improve the performance of the relevant study programmes of the study field, the higher education institution/ college has determined aims and measures, which are integrated into a joint quality assurance system.
5. The quality assurance system is being evaluated and improved "in real-time" when there is a need for it.
6. New tools are developed by RTU to better analyse and compare relevant statistical data.
7. RTU Quality Policy is aligned with the European Association for Quality Assurance in Higher

Education (ENQA) standards and guidelines.

Weaknesses:

1. Graduate follow up and feedback mechanisms could be stronger and more widely used for improvement and development of the study field.
2. Reverse feedback mechanism to the students about programme/course changes could be strengthened.
3. There is an error in the so-called top to down communication - the academic staff members are not informed about the KPI of their institute.
4. The RTU Quality policy and the related regulations are not available publicly in English, only in Latvian.

### **3. Resources and Provision of the Study Field**

#### **Analysis**

RTU's revenues and expenditures are managed according to the principles approved by the Senate or determined by the Vice-Rector for Finance.

To ensure the operation and sustainable development of study programmes, RTU has historically introduced the practice of improving the Methodology for each academic year in accordance with changes in the external and internal environment, thus eliminating potential risks in the implementation of the study programme or its study courses. All stakeholders are involved in the change process, thus ensuring transparency and a transparent decision-making process.

A three-pillar funding model has been introduced to reconcile the supply offered by higher education with the needs of Latvia's economic development and labor market, high-quality research-based higher education content, and performance management in higher education institutions. The base funding for the provision of the study process is the 1st pillar, performance funding is the 2nd pillar, and development funding is the 3rd pillar (SAR p.42).

IDT funding has been stable over the last three years and is on the rise. The increase in funding compared to the previous year (2018/2019) is 9.47%. (SAR p. 46) . The study field "Manufacture and Processing" is mainly (98.85%) funded by the state grants however, a small part (1.15%) is also income from tuition fees paid by local and foreign students. (SAR p.47)

In parallel with the training activities, research and innovation are funded. In-house research excellence grant for young researchers. Each year, the Science Support Fund receives 10% of the funding for the research base. The amount of support for one doctoral grant was planned to be 10,000 EUR (SAR p.49).

IDT is located at Ķīpsalas Street 6, in a modern study building. Infrastructure is well developed, public transport, catering, and sports activities are available. The total area of the building is 10462.78 m<sup>2</sup> with four above-ground floors (SAR p.50). IDT occupies 6602.90 m<sup>2</sup> (SAR p.50) of the total building area. More than 50 parking spaces for auto and bicycles are available next to the building, as well as access for people with special needs. The building has an elevator, an open wardrobe, drinking water, and facilities on each floor. The building houses study rooms, auditoriums, laboratories, and lecturers' offices, seminar rooms.

IDT studies also use common room computer classrooms equipped with product design software such as AutoCAD, SolidWorks.

Most of the teaching staff has a well-equipped workplace in the teaching rooms, teachers have access to stationary or portable computers, and access to a common room for copying, scanning, and printing.

To develop professional skills, IDT students have access to woodworking and textile production laboratories and workshops equipped with the necessary equipment for product design and manufacturing.

To ensure the simple and efficient identification of IT users, an IT user identity management system and a centralized intranet portal have been implemented. Intranet portal ORTUS creates and maintains a unique electronic identity for each IT user, which is valid in all information systems.

RTU has built high-speed optical internet and extensive wireless network infrastructure with more than 400 access points, including the international service Eduroam (SAR p.56).

Elections of RTU teaching staff are held following the requirements of the Law on Higher Education Institutions and regulations of the Cabinet of Ministers, based on recommendations developed by the Higher Education Council, regulations on electing professors, and associate professors. During the onsite visit, it was mentioned by the management of RTU that by the year 2022 tenure professor positions are going to be offered at RTU. As the Latvian Higher education system does not offer tenure positions on a State level, RTU is preparing this project using their savings and resources. In experts' opinion, this is an excellent step forward and will provide the university with sustainable and very capable academic staff members. It was also noted during the onsite visit that at least 1 professor from the institute implementing the study field in question will get the tenure position. The experts believe that the fact that there is no tenure in the faculty positions is a barrier to attracting qualified faculty members.

The academic and research workload of the teaching staff is defined, well structured, and balanced. Based on the additional information provided to the experts after the onsite visit, the academic and research workload proportion of every individual academic staff member is defined by taking into account the position, involvement in projects and contract work, involvement in administrative work, as well as personal competencies and experience. For example, one of the professors involved in the implementation of the programmes in the study field has mostly teaching workload (90/10), but when there is an active project with a need to involve her competencies, part of her teaching work can be done by other academic staff member and the proportion between teaching and scientific work would vary depending on what workload she would have in the project (for example, 60/40).

75 lecturers are involved in the implementation of the study field "Manufacture and Processing" (SAR p.65). Most of them 71 (95%) are elected to academic positions at RTU. The qualification of the academic staff of the study field "Manufacture and Processing" complies with the Law on Higher Education Institutions. 18 (32%) lecturers have a master's degree and 18 (24%) professors and 16 (21%) associate professors implement the study field (SAR p.65). IDT lecturers use both Erasmus + mobility opportunities and the opportunities offered by various research and study projects, such as ESF, ERDF, Nordplus. During the reporting period, 99 outgoing mobilities took place in IDT (SAR p.68 Figure 3.8.). In turn, in 2019/2020 during the study year, there was a sharp decline in mobility due to the pandemic.

Student survey data and information from student self-governments are regularly evaluated, for which lecturers what topics should be improved from the students' point of view. At the same time, proactive action is being taken to assess the potential needs of academic staff.

The Center of Academic Excellence organizes two methodological conferences a year. The autumn conference is dedicated to the modern content of study courses, while in the spring modern teaching methods are discussed. The IT User Support Center regularly organizes training for RTU employees and faculty members on IT systems and the latest technology tools.

There is cooperation with the Institute of Technical Physics, the Institute of Polymer Materials and the Institute of Silicate Materials, the Institute of the General Chemistry Technology, the Institute of Biomedicine Engineering Sciences and Nano-technologies.

RTU Career Support and Services Department provides a wide range of career and psychological support to students. For potential students: study programme choice consultations; study choice consultations and profiling of abilities; career choice seminars within the RTU Open Days and upon request. Existing students: regular seminars, career days, student summer camps, online resources, psychological support.

International students at the RTU Department of International Cooperation and International

Students have academic advisors who provide support in matters related to studies in general and practical matters.

In 2020, guidelines were issued with recommendations for effective communication and improvement of the study environment for people with disabilities and special needs.

At the request of the academic staff of the specialization field "Clothing and Textile Technology", 42 new books were purchased by the SL amounting to 3956.42 EUR in the period of 2013 - 2020. At the request of the academic staff of the specialization field "Material technology and Design", 49 new books were purchased by the SL amounting to 2975.86 EUR in the period of 2013 - 2020. (SAR p.57) This means that an average of 13 books were purchased each year between 2013 and 2020. Compared to the total amount of 1.3 million printed documents in SL funds (SAR p. 56) . But according new trends RTU use e-sources with different databases.

In the reporting period from 2013 to 2019, there were 48 incoming mobilities from ten countries in the study field "Manufacture and Processing". The highest number of mobilities were from Lithuania, a total of 21, followed by mobilities from Russia (6), Romania (4) and Germany (4). (SAR p.67) Repetition of mobilities is logical, as close cooperation has developed with many universities in the area of both studies and science. IDT has very good cooperation with Kaunas University of Technology, Vilnius University of Applied Sciences, Romanian Georghe Asachi Tehinko University, Russian Southern Federal University, as well as Tallinn University of Applied Sciences (SAR p.69)

During the visit, the experts were able to ascertain that the IDT is continuously taking appropriate improvement measures, evaluating the outcome and effectiveness of the measures taken.

There is a common system and procedures for the improvement and purchase of the material, technical, methodological, and informative provision, in place. According to the expert, the purchase of materials for the development of design projects is sometimes delegated to students themselves.

## **Conclusions. Strengths and weaknesses**

The RTU has developed a system to determine the financial resources required for the implementation of the study field and the study programmes. There is a system for financing and this system is efficient.

The RTU identified the infrastructure resources and the material and technical provision required for the implementation of the study field, and the students and the teaching staff have access to the necessary resources. There is a common system and procedures for the improvement and purchase of the material, technical, methodological, and informative provision, etc. in place.

The IDT has developed and it implements and complies with the procedures for attracting highly skilled teaching staff. The academic and research workload of the teaching staff is balanced. The needs of the teaching staff for professional and didactic improvement are identified in a target-oriented manner.

The teaching staff members take part both in outgoing and incoming mobility, which brings added value to the implementation of the study process and the study quality.

The higher education institution has identified the support necessary for the students and established a well-functioning support system, based on the needs of the students.

Strengths :

1. The decision-making process for study programme funding is defined and transparent.
2. Funding is provided on an upward trend.
3. Doctoral students can receive additional grant funding.
4. IDT is located in a renovated, modern building with a well-developed internal and external infrastructure and scientific laboratories.
5. Computer classrooms are equipped with quality computers and product design software, AutoCAD, SolidWorks.

6. A unified IT user identity management system and a centralized intranet portal ORTUS have been introduced, as a result of which a unique electronic identity is created and maintained for each IT user, which is valid in all information systems.
7. Good integral cooperation with other RTU scientific laboratories has been established for IDT study programmes.
8. A Design Factory has been created with the possibility to test projects in a practical business environment.
9. Faculty members take advantage of internships in companies in the sector, as well as opportunities offered by various research and study projects, such as the ESF, ERDF, Erasmus, Nordplus, etc.
10. Starting from the year 2022 tenure positions will be available to RTU professors.

#### Weaknesses:

1. The share of external income in the amount of funding for the study field is very small
2. The issue of centralized procurement of materials for laboratory practical work has not been resolved.
3. The increase of expenses per student.

## 4. Scientific Research and Artistic Creation

### Analysis

Research at IDT is performed following the strategic research directions of RTU. RTU has established six research platforms namely, Energy and Environment, City and Development, Information and Communication Technologies, Transport, Security and Defence, Materials, Processes, and Technologies. The research is often interdisciplinary and is executed by faculty members teaching at the different courses of the study field satisfying the needs of the national economy and society. The research carried out in this study field is compatible with the strategic direction of Materials, Processes, and Technologies.

The faculty members who are teaching in the study field “Manufacture and Processing”, are actively engaged in research activities. The main thematic areas that the research work is concentrated on are (a) Textile and clothing technology and (b) Wood materials and technology.

IDT implements one Ph.D. study programme in the area of “Fibre Materials Science”. It is the only Ph.D. programme in Latvia providing training in the scientific field of textile and clothing technologies. The Ph.D. research projects are closely related to industry needs and are undertaken in close collaboration with industrialists. Ph.D. students perform scientific work in the design, development of innovative fiber materials, as well as the introduction of new technologies. Ph.D. and Master's students are involved in scientific projects that are implemented by FLPP, Interreg, ERDF, ESF, Erasmus+.

The academic staff of the study field “Manufacture and Processing” are actively engaged in promoting international cooperation in scientific research and participate in international scientific conferences and activities. Faculty members participate in Industry-funded research projects as well as European projects in cooperation with European universities and other research organizations.

Indicative projects as those are described in the SAR are:

1. ERDF, 1.1.1.2. “Post-doctoral research support” project “Structures and technology development of smart insulation materials for indoor microclimate regulation” (1.1.1.2/VIAA/1/16/152). Implementation period from 16.10.2017 to 15.10.2020. Cooperation Partner: The Leibniz Institute for Agricultural Engineering and Bioeconomy.
2. Interreg Baltic Sea Region project “Smart and Safe Work Wear Clothing”. Implementation period from 01.03.2016 to 01.03.2019. Cooperation Partners: Tallinn University of Applied Sciences, Tallinn,

Estonia; IW Textile Research Institute, Lodz, Poland; Vilnius University of Applied Sciences, Vilnius, Lithuania; SIA «SRC BRASA», Riga, Latvia; PW Krystian Sp. Zo.o, Pschisuha, Poland; AS Proffline, Tallinn, Estonia; Oy PDService Ltd, Kokkola, Finland; Ansell Protective Solutions Lithuania, Ltd, Taurage, Lithuania.

3. RTU Scientific Research Project for Young Scientists “Nonwovens as Sound Reduction Increases” (ZP2016/31). Implementation period from 03.05.2016 – 30.04.2017. Involved partner: Tallinn University of Technology.

4. RTU Scientific Research Project for Young Scientists “Humidity absorption properties of hardwood veneer produced by Sol-Gel process”. Implementation period from 01.05.2016 – 30.04.2017. Involved partner: The Leibniz Institute for Agricultural Engineering and Bioeconomy.

5. Erasmus+ strategic partnership cooperation project 3481/2017/2017-1-ES01-KA202-038419 “Circular Economy Innovative Skills in the Textile Sector”. Implementation period from 01.11.2017 – 30.12.2020. Cooperation Partners: Confederación de la Industria Textil - TEXTOR (Spain), Hellenic Fashion Industry Association - SEPEE (Greece), Technical University of Iasi – TUIASI (Romania), Centro Tecnológico das Industrias textile e do Vestuário de Portugal – CITEVE (Portugal).

On average 109 publications are published per year in scientific journals and conferences which is considered a relatively good number. Most of the publications are indexed in scientific databases. The biggest part of publications are cited in SCOPUS database (359 publications) and WoS (244 publications). However, the experts suggest the continuation of this effort aiming to the development of quality research work that is published in high-rank journals.

As stated in the SAR in the period 2013 to 2020, faculty members of the study field “Manufacture and Processing” have been involved in 29 various projects funded by the European Regional Development Fund, Erasmus, Interreg, the European structural funds, the State Research Program e.t.c. The experts believe that the effort should be strengthened to participate in more projects, especially the European-funded projects given the quality of the faculty and the students that the study field has.

The university provides support to faculty members and Ph.D. students towards fostering their research activities. An “RTU Regulation of Research Support Fund” is in place as of 15 December 2014 aiming to provide financial support for various research-related activities, such as support for maintenance of research equipment, protection and licensing of intellectual property, covering of expenses related to the Ph.D. study process, publishing of scientific journals, participation, and organization of scientific conferences, support to researchers in establishing new laboratories, etc.

In the SAR it is mentioned that doctoral grants are provided to Ph.D. students on a competitive basis whereas International calls are made to attract post-doctoral projects.

Further on, internal project calls provide additional funding for publishing articles in SCOPUS/WoS indexed journals, and internal projects.

During the interview faculty members stated that they try to take advantage of those funds to increase their research activities. But there is no evidence that the IDT has taken advantage of the international calls to attract post-doctoral students.

An internal regulation on Ph.D. project supervision asks that faculty members who supervise Ph.D. projects should be listed as approved experts in their field. The approval process for the experts is organized by the Latvian Council of Science and the database of the experts is published on the National Research Information System (NRIS). This requirement is an additional incentive towards the engagement of faculty members in research activities.

Key Performance Indicators (KPIs) including research indicators are developed for each faculty member the achievement of which fosters the research performance of faculty members and consequently the research performance of the study field and the university as a whole. The achievement of KPIs is connected with financial support that the faculty members receive from the so-called university “performance-based funds”.

During the interview of the faculty members, the experts realized that the faculty members are not

aware of those KPIs. It seems that there are distortions in the flow of information and the top-down communication is problematic.

In the university, a sabbatical leave policy is in place aiming to facilitate faculty members to work on research projects. Unfortunately, the faculty member of this study field did not take advantage of this opportunity. One of the main reasons is that the majority of the faculty members are not aware of the existence of the policy and/or its main characteristics and provisions.

The output of research projects is considered during the process of programme revision. Faculty members have the chance during the programme revision process to incorporate research developments in the content of the courses in the form of theoretical conclusions and practical examples.

As stated in the SAR and assured during the meetings the link of scientific research with the study process is reflected on the topics and content of the graduation papers. Students use in their graduation papers all the knowledge acquired during the study process, as well as new specific knowledge related to the topic of the graduation paper.

The study process implemented in the study field “Manufacture and Processing” has always been creative and related to innovations in the design of products and processes. Students regularly participate in internal and external exhibitions and competitions of various types. AS stated in the SAR in the academic year 2017/2018, the Bachelor level students completed the study module “Innovative Product Development and Entrepreneurship”. The study methodology of the study module is based on joint creation, integration of the parties involved in the development of new products and commercialization in the study process, provision of continuous feedback on the results of the group work of the students involved in the study process and their achievements. It is targeted at learning by doing and developing integrated theoretical knowledge.

Further on in the project work of the study courses “Planning of industrial collections” and “The Development of Industrial Clothing Collections” teams are created according to the model of experimental sections of clothing manufacturing undertakings where a designer, a constructor, and a technologist work together in developing an industrial collection. Students are exposed to an actual work situation where team solutions need to be found and a collection that can be industrially manufactured for a defined target audience is designed.

An innovative approach that is followed is that the study process of the study programme “Design Engineering” is based on project-focused education. Students have to implement 3 study projects related to the topic of their Master's thesis during 2 study years. The Master thesis is the third project. In this way, students are involved in the planning and execution of the Master's thesis since the start of their studies.

The students are actively engaged in scientific research as they are involved in the implementation of large and small-scale projects. The SAR mentions a number of funded research projects where students and especially Ph.D. students are actively involved. An indicative example is the participation of 4 Ph.D. students in the European Social Fund project, “Human Resources and Employment”, Activity 1.1.1.2 “Attracting human resources to science” “Development of innovative technologies for heat and cold storage and production” 2013/0064 / 1DP / 1.1.1.2.0 / 13/APIA/VIAA/050. The project has been implemented in cooperation with the Institute of Physical Energy and the Agency of the “Scientific Institute of Agricultural Machinery” of the Latvian University of Agriculture.

## **Conclusions. Strengths and weaknesses**

The university in general provides support to faculty members and Ph.D. students towards fostering their research activities. The faculty members and Ph.D. students are actively engaged in research activities. Mechanisms towards the promotion of the involvement of the students in scientific

research are developed. The tools and support initiatives that the university is undertaking are not communicated down to the faculty members. During the interviews, it was clear that there is a lack of information flow. KPIs in terms of research accomplishments are in place but those are not communicated to the faculty members. Scientific research and the outcomes are integrated into the study process and the curriculum of the study programmes. There is a form of international cooperation in the field of scientific research within the study field. The study process implemented in the study field is creative and related to innovations in the design of products and processes.

#### Strengths:

1. Active support of the university to foster research activities. At the university level, there are many research support tools. It includes research funds, development of KPIs, opportunities for taking sabbatical leave e.t.c
2. Large number of product and technology development research projects. Faculty members have been involved in 29 various projects funded by the European Regional Development Fund, Erasmus, Interreg, the European structural funds, the State Research Program e.t.c

#### Weaknesses:

1. Failure to attract international doctoral and post-doctoral students.
2. Failure to communicate research support tools and policies to the faculty members. KPIs, Sabbatical leave opportunities are not well communicated to faculty members.

## 5. Cooperation and Internationalisation

### Analysis

The study field has developed successful cooperation with local industry entrepreneurs, organisations and state institutions. This cooperation is strengthened throughout the years in the form of organizing seminars, inviting guest lecturers on the courses, joint product development projects, receiving information for revisions of courses to adapt with the needs of the industry, providing consulting services to the industry, providing internship to the students etc.

The cooperation partners are selected taking into consideration the specific features of the study field and the study programmes. According to the information provided in the SAR the RTU, IDT and the study field has close cooperation with the Association of the Light Industry Undertakings, the Latvian Association of Wood Processing Entrepreneurs and Exporters and the Latvian Association of Designers. More specifically representatives of the above associations are involved in the decisions that are taken by the study field bodies and provide relevant information and research support.

This representation should be strengthened at the level of the study field. The suggestion is to set up an External Advisory Board for each program (not study direction), aiming at assisting towards the identification of the industry needs and adjusting the programme content accordingly. Membership could include representatives of Industry and Employer's Organisations, the Alumni Association, Representatives of Labour Organizations, and distinguished members of the academic community in areas related to the programme thematic areas. The meetings of the Advisory Board should be regular and formal ( minutes should be kept) and the outcome should be part of the documentation that should be considered towards the study programme curriculum development. The Advisory Board must be integrated into the programme development process and should provide guidance and information in the revision of the courses, safeguarding that course content satisfies industry needs.

As stated in the SAR IDT has close cooperation with many schools and higher education institutions and research centres in Latvia and abroad, In total 108 local cooperation agreements have been signed. Indicative examples are:

- (a) the cooperation between RTU and the Latvian University of Agriculture (LLU), the University of



Latvia (LU), Riga Stradins' University (RSU) on cooperation in the implementation of the study process and science development matters.

(b) The cooperation with the wood processing department of the LLU Faculty of Forest. The Bachelor level students are involved in cooperation projects related to the search for the application of new wood materials in products and interiors. The Master and Ph.D. level students visit the department and the "Institute of Research and Development of Forest and Wood Products" performing research and developing study graduation papers.

The cooperation with European and other international organizations and institutions is in the form of Joint projects, student's mobility, product and process development projects, training professionals as well as undertaking research and product development activities in the field of textile, wood and other fibre materials.

More specifically as mentioned in the SAR the academic staff of IDT has close cooperation with the leading Baltic universities in the form of students and academic staff exchange as well as research, consulting projects, joint publications etc. There is a regular exchange of students, Ph.D. students and professors with Kaunas University of Technology (KTU), as well as an expert examination of scientific works. Ph.D thesis are supervised jointly with KTU professors, there is joint work on the promotion councils of both higher education institutions. Cooperation with Vilnius University of Applied Sciences is mainly in the field of research, mutual consultations in science, exchange programs, expert examination of scientific works, with the University of Tartu - research cooperation, consultations of Ph.D. students, joint publications; with Tallinn University of Applied Sciences and Tallinn University of Technology- research cooperation and joint projects.

During the report period cooperation has been developed with the scientific research institutions and higher education institutions of Nordic countries as follows: in Finland with Aalto University with VTT Technical Research Centre of Finland and with Centria University of Applied Sciences; in Sweden with the Swedish School of Textiles of the University of Borås - research cooperation, expert examination of scientific works and students' mobility. Cooperation has been established and developed with Politecnico di Milano in Italy and the University of Minho in Portugal - research cooperation, guest lectures of professors.

In cooperation with universities and research institutes in Germany, joint projects are being developed fostering the Ph.D and Post-Doctoral scientific research and consequently joint scientific publications. A good example is a cooperation with the RWTH Aachen University; Niederrhein University of Applied Sciences and Leibniz Institute for Agricultural Engineering and Bioeconomy, Postdam.

The experts' team suggests that those corporations should be strengthened and extended beyond joint scientific publications towards the development of new products and process innovations.

The number of international students attending courses in this study field is very disappointing. As presented in the SAR within the study field, only two study programmes currently offer studies in the English language - the professional Bachelor study programme "Clothing and Textile Technology", from the academic year 2018/2019, and the professional Master study programme "Design Engineering" from the academic year 2020/2021. The number of incoming students is low. In the professional Bachelor's study programme "Clothing and Textile Technology" 4 students came in 2018 and 5 students in 2019. No international students are attracted to the master and doctoral courses. It is expected that the Master study programme will attract international students if the proper promotional activities are undertaken.

The internship is included in three study programmes of the study field: the professional Bachelor's study programmes "Clothing and Textile Technology", "Materials Technology and Design" and professional master study programme "Design Engineering". The university concludes cooperation agreements with companies and organizations, where the parties agree on the provision of internship places to students. The university has developed internal regulations that cover the procedure that is followed in this process. Further on, additional initiatives are taken by the

university to facilitate the proper implementation of internship activities.

More specifically, the Career Support and Services Unit, assists students in finding and addressing companies where to undergo internships and promotes the development of career management skills through a variety of activities. Once a year, the Career Support and Services Unit organizes RTU Career Day, where students have the opportunity to meet face-to-face with company representatives and discuss career opportunities. In 2015 a website was developed where companies can post their vacancies while students have the opportunity to log in with the university username and keep abreast of current internships and job opportunities in their field.

Agreements on the internship possibilities for students are concluded with 36 undertakings. As stated in the SAR the students of the specialisations of the clothing and textile technology do their internship in the following undertakings: Spectre Latvia SIA, New Rosme SIA, Fristads Kansas Production SIA, Brasa SRC, Lauma Lingerie A/S, 66 North Baltic SIA, Solutions SIA, Artex Latvia SIA, Nybo Dobeles SIA, Printful Latvia SIA, Snickers Production Latvia SIA, Catamaran Sports SIA, Aspect SIA, Valmieras Stiklašķiedra A/S, Label Pro SIA, Lauma Fabrics LSEZ, Limbažu tīne SIA, etc. The students of specialisations of the materials technology and design have done their internship in manufacturing and design undertakings as follows:: In 4no. clothing and textile industry undertakings, 5no. interior design undertakings, 9no. furniture design, manufacturing and sale undertakings, and 2no undertakings of design, manufacturing and construction of active recreation zones.

During the interview of the employers and organizations, it was stated that the graduates of the study field are highly respected. As it is stressed, a number of companies base their competitive advantage on the skills and knowledge of the graduates they employ.

IDT has cooperation with several higher education institutions and research institutes. During the reporting period from 2013 to 2020, a range of academic staff from various countries has visited IDT. Various support programs, like Erasmus+, Nordplus, and the opportunities in other scientific and study projects are used for the attraction of guest academic staff. During the reporting period, there have been regular methodological and scientific cooperation, mutual exchange of experts, exchange of guest lectures etc. Guest academic staff is regularly involved in the study field, thus ensuring sharing of knowledge and experience. In the reporting period from 2013 to 2019, there were 48 incoming academic staff mobilities from ten countries. The highest number of mobilities were from Lithuania, a total of 21, followed by mobilities from Russia (6), Romania (4) and Germany (4). Repetition of mobilities is logical, as close cooperation has developed with many universities in the area of both studies and science. IDT has very good cooperation with Kaunas University of Technology, Vilnius University of Applied Sciences, Romanian George Asachi Iohannide University, Russian Southern Federal University, as well as Tallinn University of Applied Sciences and others.

A shortcoming of the study field is the failure to develop joint study programmes. Although the study field has developed some cooperation with universities abroad no joint study programmes are developed. No procedures for the development and implementation of the joint study programmes are in place. The experts are convinced that the development of a joint study programme within the study field can foster the research activities of faculty members and the exchange of good academic practices and pedagogical approaches.

## **Conclusions. Strengths and weaknesses**

The study field has developed successful cooperation with local industry entrepreneurs, organizations, state institutions as well as local universities. There are good links in the industry in the form of joint projects on product and process development as well as internship placements. The study field has cooperation with several higher education institutions and research institutes. Guest academic staff is regularly involved in the study direction, thus ensuring sharing of knowledge and

experience. The international orientation of the study field should be further strengthened to attract international students.

#### Strengths

1. The study field has developed very close relationships with the local industry.
2. A robust, very well-organized internship scheme is in place.
3. The graduates of the study programmes in the study field are very well respected in the local industry. Many organizations base their competitive advantage on the skills and knowledge of the study field graduates.

#### Weaknesses

1. No procedures for the development of joint study programmes are in place.
2. The study field failed to attract international students and permanent foreign academic staff. The mechanisms that are in place for the attraction of international students are weak.
3. Agreements with international organizations and universities leading to joint publications are limited. The study field should strengthen that cooperation so as to get tangible results such as product and process innovations.
4. The study field doesn't have an Advisory Board for each program with members from industry associations, graduates' associations, the labour unions e.t.c.

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

### **Analysis**

Regarding the study field, the previous experts' group provided recommendations that are listed below.

1. Methodology needs development (study programmes: "Material Technology and design", "Clothing and Textile Technology").

In the Annex (Recommendation implementation report) information is provided about the ways how this recommendation has been implemented. Study programmes are oriented to study results, students participate in various projects during the semester. Every semester RTU organizes a survey of students, the results of which are used to improve the study process. During the visit, the experts were able to make sure that the students enjoy the practical work and group work that is used in the study process, but there is room for improvement here, as students think that there may be more of these types of activities. Experts point out that this recommendation has been taken into account.

2. Need a little more personal e-communication (study programmes: "Material Technology and design", "Clothing and Textile Technology").

In the Annex (Recommendation implementation report), information is provided about the ways how this recommendation has been implemented and during the visit, experts were able to make sure that the ORTUS system is useful for both ways of e-communication. Experts point out that this recommendation has been taken into account.

3. No internal QAS in place (study programmes: "Material Technology and design", "Clothing and Textile Technology", "Fibre Material Science").

This recommendation has been taken into account. Principles defined in the RTU Quality Policy (approved on the 25th of September, 2017 in RTU Senate meeting) are in place, are coherent, and oriented to continuous improvement and development. The aforementioned principles apply to each department of RTU and are taken into account when writing a strategy for each department, which also includes the KPIs. The overall RTU Quality policy is also improved from the feedback gained of the departments and other stakeholders, therefore the process is evaluated as coherent and efficient.

4. Need to use a little bit more e-communication (study programmes: “Material Technology and design”, “Clothing and Textile Technology”).

In the Annex (Recommendation implementation report) information is provided about the ways how this recommendation has been implemented and during the visit, experts were able to make sure that students and academic staff have access to remotely accessible international databases. Licenses for software necessary for the study process students can use on their personal computers. During the site visit, experts were able to see that the ORTUS system is a very important platform for e-communication between students and the university, between students and academics. Experts point out that this recommendation has been taken into account.

5. Severe savings in the long term will cause the economic crisis caused quality problems (study programmes: “Material Technology and design”, “Clothing and Textile Technology”).

In the Annex (Recommendation implementation report) information is provided about the ways how this recommendation has been implemented. The study programme “Clothing and Textile Technology” is now being implemented in the English language to attract foreign students and increase the income level of the study programme. During the visit, the experts were able to see that the situation with significant savings raises many questions related to the high proportion of elective courses and the number of students in these elective courses. It can also be concluded concerning foreign students that a study programme is opened for one student, which is not economically justified. Consequently, the experts consider that these recommendations have not been met.

6. Training in modern learning methods some academic staff need a good native language and English skills. Non-applicable for foreign students, because of...? (study programmes: “Material Technology and design”, “Clothing and Textile Technology”). English modules/courses possible, but not full study programme (study programmes: “Material Technology and design”, “Clothing and Textile Technology”, “Fibre Material Science”)

The annex (Report on the implementation of the Recommendation) provides information on how these three recommendations have been implemented:

- Academic staff have the opportunity to get acquainted with modern learning methods and students very positively evaluate group and practical work. Experts point out that this recommendation has been taken into account. This also applies to teaching methods and English language learning for academic staff working with foreign students.

- Academic staff under different projects had the opportunity to improve their English skills. For the academic staff members who implement their courses in English, the language level is adequate. Experts were assured of the quality of English level during the onsite visit - the overall level of spoken English was good.

- The CV of the academic staff confirms the knowledge of the native language.

7. There is no planned research career for staff development outside (study programmes: “Material Technology and design”, “Clothing and Textile Technology”, “Fibre Material Science”).

The annex (Report on the Implementation of the Recommendation) provides information on how this recommendation has been implemented, and during the visit, the experts were able to ascertain that academic staff can participate in various projects at the national (together with industry) and international level. Experts point out that this recommendation has been taken into account.

8. Students have missed the feedback (study programmes: “Material Technology and design”, “Clothing and Textile Technology”).

The annex (Report on the Implementation of the Recommendation) provides information on how this recommendation has been implemented, and during the visit, the experts were able to make sure that RTU student surveys are organized twice a year, but the level of students to participate in this activity is low. The potential feedback from these surveys could be better and could be higher than student activity. Experts believe that this recommendation has been partially taken into account.

9. No room for anything else. No agreements. (study programmes: “Material Technology and

design", "Clothing and Textile Technology").

The annex (Report on the Implementation of the Recommendation) provides information on how this recommendation has been implemented. Students have the opportunity to participate in ERASMUS + mobility, fashion shows. Experts point out that this recommendation has been taken into account.

10. No agreements (study programmes: "Material Technology and design", "Clothing and Textile Technology", "Fibre Material Science").

The annex (Report on the implementation of the Recommendation) provides information that there are more than a hundred agreements in the field of studies. Experts point out that this recommendation has been taken into account.

11. Lack of incomes of students (for study programme "Clothing and Textile Technology")

The annex (Report on the implementation of the Recommendation) provides information that a study programme is now being implemented in the English language - it is offered to foreign students. Thus, the experts point out that this recommendation has been partially taken into account. On the one hand, offering this study programme in English has more opportunities to increase the number of students, but on the other hand, there is a lack of a strategy to attract foreign students.

12. No successful projects to attract foreign students or teachers. (study programmes: "Material Technology and design", "Clothing and Textile Technology", "Fibre Material Science").

The annex (Report on the implementation of the Recommendation) provides information that the foreign academic staff was involved in the study field during the evaluated period. The involvement of foreign academic staff was implemented within the framework of various projects. Experts point out that this recommendation has been taken into account, but to increase the quality of studies and research, it would be expedient to expand cooperation with foreign partners and attract more foreign academic and research staff.

13. No external experts involved (study programmes: "Material Technology and design", "Clothing and Textile Technology", "Fibre Material Science").

The annex (Report on the implementation of the Recommendation) provides information that external experts were involved in the study programmes. Experts point out that this recommendation has been taken into account.

Experts recommendations for the Master study programme "Design Engineering"

1. To provide all academic staff of the study programme an opportunity to use Erasmus + mobility and refresh their skills/knowledge by attending the offered courses.

The annex (Report on the implementation of the Recommendation) provides information and experts point out that this recommendation has been taken into account in part, as there is room for improvement. The level of ERASMUS+ mobility should be increased, but recent data on the involvement of academic staff in mobility do not reflect the real situation that was significantly affected by the pandemic. However, there is a need to promote mobility to increase the number of lectures given by foreign lecturers accordingly.

2. To ensure the supplementation of the amount of available study literature necessary for the realization of the study process in English, the methodological provision of the content of study courses, as well as the attraction of foreign visiting lecturers.

The annex (Report on the implementation of the Recommendation) provides information and experts point out that this recommendation has been taken into account.

3. To continue to supplement the library collection with the latest literature sources related to students' specializations and thematic modules.

The information available in the library confirms that this recommendation has been partially followed. The experts concluded that in the RTU library the latest literature is partially available for some subjects, but for other study subjects it is not available at all, therefore the supplementation of the literature should be continued.

4. To make amendments to the regulatory enactments of the university to increase the autonomy of

the structural unit over the study programme to be implemented – to provide an opportunity for waiver of compulsory language courses.

The annex (Report on the implementation of the recommendation) provides information that the situation will be assessed, if necessary, and will be implemented in the academic year 2023/2024.

## **Conclusions. Strengths and weaknesses**

Based on the above recommendations, significant improvements have been made. However, there is still room for improvement in the international dimension of studies.

Strengths:

1. Study programmes are offered in English.
2. Staff training is provided.

Weaknesses:

1. Internationalization (inbound and outbound mobility, English language courses, etc.) still needs to be improved.
2. There is a lack of a plan to attract foreign students.

## **7. Assessment of the Requirements for the Study Field**

- 1 R1 - Pursuant to Section 5, Paragraph 21 of the Law on Institutions of Higher Education, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study direction whilst implementing their internal quality assurance systems:

**Assessment of compliance:** Fully compliant

RTU has several mechanisms for study quality improvement, including RTU Quality Policy as well as RTU Excellence Approach and the mechanisms for evaluating teaching staff, getting feedback, and updating relevant study programmes (SAR, pp. 9-10), however, in experts opinion there is room for improvement in regards to feedback mechanisms and so-called “top to down” communication in order for the system to be even more effective. (Please see analysis in Part 2 of this report)

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

**Assessment of compliance:** Fully compliant

RTU maintains a Quality Policy (QP) that dictates the procedures for quality assurance and development of study programmes with clearly defined procedures, as well as the RTU Excellence Approach.

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

**Assessment of compliance:** Fully compliant

The internal development and review of study programmes take place in accordance with the “Procedure for the application, elaboration and amendment of the study programmes” (approved at the Meeting of RTU Senate on 26 April 2021, Minutes No 649). Inspection and

supervision of the programmes are carried out annually. (SAR p.35)

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

**Assessment of compliance:** Fully compliant

The evaluation of students results and learning outcomes takes place in accordance with the "Regulation on the Assessment of Learning Outcomes" (approved at the Meeting of RTU Senate on 29 May 2017, Minutes No 610) and "Regulation on Final Examinations at RTU" (approved at the Meeting of RTU Senate on 26 April 2021, Minutes No 649). (SAR, p. 12)

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

**Assessment of compliance:** Fully compliant

Professors and associate professors are reevaluated and reelected every six years. Candidates are obliged to comply with certain criteria in terms of scientific research, i.e., a number of publications or patents, supervised Doctoral candidates, etc. (Decision of RTU Senate No. 649 "On approval of the RTU Regulations "On the Procedure for Election of a Candidate for the position of Professor or Associate Professor and the Procedure for Assessing the Qualification of an Existing Professor or Associate Professor" in a new edition" as of 26 April 2021). (SAR Report p. 76)

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

**Assessment of compliance:** Fully compliant

RTU set performance indicators are assessed and analyzed and reflected in self-made quality assessment reports. Information on the student progress, academic achievements, drop-out rates, student satisfaction with the study programmes, and graduate career is summarized using statistical methods and surveys and with cooperation with the State Revenue Service. (SAR, p. 13)

- 7 1.6. The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study direction whilst implementing their quality assurance systems.

**Assessment of compliance:** Fully compliant

As disclosed in the RTU Quality Policy internal quality is ensured by the Faculty Council, the Study Direction Committee and Directors of the study direction, Directors of the study programmes, administration of the institutes and chairs implementing study programmes. To ensure continuous development of the study programmes, RTU Study Direction Committees monitor academic activities in the relevant study direction and are responsible for the quality of the study programmes within the study field (SAR, p. 14).

- 8 R2 - The cooperation with different organisations from Latvia and abroad implemented within the study direction ensures the achievement of the aims of the study direction.

**Assessment of compliance:** Fully compliant

The study field has developed successful cooperation with local entrepreneurs, organizations,

state institutions, as well as local universities and universities from other countries. According to Part 5 of this report, there are some shortcomings (insufficient cooperation with foreign partners, insufficient number of foreign students and academic staff) that need to be improved, but they do not directly affect this assessment.

- 9 R3 - Compliance of scientific research and artistic creation with the development level thereof (if applicable).

**Assessment of compliance:** Fully compliant

There is evidence of scientific publications, opinions and research projects. According to Part 4 of this report, there are some shortcomings (insufficient international research) that need to be addressed, but they do not directly affect this assessment.

- 10 R4 - Elimination of the shortcomings and deficiencies identified during the previous assessment of the study direction, if it has been conducted, or the implementation of the provided recommendations.

**Assessment of compliance:** Partially compliant

Significant improvements have been made. However, there is still room for improvement in the international dimension of studies (inbound and outbound mobility, English language courses) a lack of a plan to attract foreign students (See analysis in Part 6 of this report).

## 8. Recommendations for the Study Field

### Short-term recommendations

1. The study field should use communication tools to communicate information and decisions to teaching staff and students. It is very important to develop communication mechanisms within 2 years. The so-called "top to down" communication should be improved in 2 years as the academic staff members should be informed about the set KPIs of the institute.
2. The study field should establish an Advisory Board for each program with members from industry associations, graduates' associations, the labour unions e.t.c. within 2 years. The Advisory Board must be integrated into the programmes development process and should provide guidance and information in the revision of the courses, ensuring that course content satisfies industry needs.
3. Until the start of the next academic year the reverse feedback mechanism to the students about changes made in programme/study courses should be made available via ORTUS or other internal RTU platform accessible to students.
4. Within one-year agreements need to be reached with leading industry companies on a centralized supply of materials for workshops and laboratories.

### Long-term recommendations

1. Increase the amount of organized practical creative work for students during study courses within 3 years.
2. Develop an internationalization strategy for attracting foreign students and academic staff within 4 years.



3. Existing graduate follow-up and feedback mechanisms should be strengthened and additionally established until the next accreditation procedure, a clear strategy for periodic follow-up might be useful to keep track and further improve the study field.
4. Until the next accreditation procedure, the RTU Quality Policy and study-related regulations should be made available publicly in English for foreign lecturers and/or students.
5. Implement working methods that will help to stop or at least slow down the increase of expenses per student in the next 4 years period.
6. The share of external revenue needs to be increased by relieving part of the basic budget in the next 4 years period.

## **II. "Clothing and Textile Technology" ASSESSMENT**

### **II. "Clothing and Textile Technology" ASSESSMENT**

#### **1. Indicators Describing the Study Programme**

##### **Analysis**

The name of the professional bachelor's degree study programme "Clothing and Textile Technology" (42542) corresponds to the evaluated study field "Manufacture and Processing". The aim of the study programme is "to train highly qualified engineers of the LQF level 6 for the textile and clothing industry - specialists in textile technologies, clothing technologies and clothing construction, familiar with the basics of modern technologies and specialised design methods, providing students with engineering training and basics of materials science in the textile and clothing technology sub-sector, as well as creating a basis for further studies to acquire a higher level of knowledge and competence" is clearly defined. The aim and the tasks of the study programme comply with the learning outcomes, as well as the admission requirements are appropriate. Graduates receive a Professional bachelor's degree in Clothing and Textile Technology and Professional Qualification Engineer in Clothing and Textile Production.

Admission of applicants to the full-time basic study programme in Latvian is done based on the results of General or vocational secondary education, but for foreign applicants - general or vocational secondary educational assessment of the level of English language skills in accordance with the requirements specified in regulatory enactments. The admission requirements of the study programme correspond with the bachelor study programme entrance requirements and are in line with Articles 46 and 47 of the Law on Higher Education Institutions and the Cabinet Regulations No 846 "Regulations Requirements, Criteria and Procedures for Admissions to Study Programmes" of 10 October 2006. Admission requirements for foreign applicants' correspond with the RTU Senate meeting of October 28, 2019, Protocol Nr.633 and they must pass the entrance exam in English and mathematics.

The professional standard "Clothing and Textile Production Engineer" is included in the industry map (LKI level 6) ([https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK\\_tekstils.pdf](https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK_tekstils.pdf)) and it is included in the Cabinet Regulation No. 626. <https://likumi.lv/ta/id/302154-noteikumi-par-obligati-piemeramu-profesiju-standartu-un-profesionalas-kvalifikacijas-prasibu-sarakstu-un-taja-ieklauto-profesiju>, also VISC this standard is available: [https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/20170614\\_Profesiju\\_standarti\\_5.pdf](https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/20170614_Profesiju_standarti_5.pdf)

However, given that work is currently underway to develop the new standard, means that RTU will need to ensure that the programme complies with the newly approved standard.

#### **Conclusions by specifying the strengths and weaknesses**

The study programme prescribes the acquisition of both the corresponding professional Bachelor's degree and the professional qualification.

Strengths:

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.

Weaknesses:

1. The SAR program does not include information on the draft new professional standard. Currently, work is underway on the new professional standard, which corresponds to the professional qualification awarded to the graduates of this study programme. The management of the study programme must be ready to make the necessary changes in the study programme, ensuring its compliance with the new professional standard.

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

### **Analysis**

The professional bachelor study programme "Clothing and Textile Technology" is implemented by the Department of Clothing and Textile Technologies of the Institute of Design Technologies (IDT) of the Faculty of Materials Science and Applied Chemistry (FMSAC).

The study programme consists of 160 CP and consists of study courses (128 CP), the practical placement (20 CP), and the state examination (12 CP), where the development and defense of the Bachelor's thesis is an integral part. The content of the study programme complies with the requirements of the standard with the Cabinet Regulations No. 512 that confirms the comparison of the study programme to the requirements of the standard in Annex 2.1.

The descriptions of the study courses are well prepared. In general, the course descriptions include all the required information: goals and objectives of the course in terms of competencies and skills, structure and tasks of independent studies, course content and planned hours, learning outcomes and assessment, recommended literature, and additional sources of information, evaluation criteria of study results and course value in credit points. Mention should be that literature for some study courses is given very extensively and without citation of obligatory and additional literature. More recent study literature is seen in most curricula. But for subjects from the fields of product design and development, garment pattern making, textile materials, several recent pieces of literature remains that are not observed in the curricula or the RTU library. For example, the literature Product Design and Development\_2020 is in the RTU library and not in the study course description; the literature Construction and Pattern Making for Fashion Design\_2018 is in the study course description and could be added to the RTU literature collection for wider access to the literature. For subjects from the field of textile materials more recent literature can be added in the study course description and the RTU library if it is not within e-sources, such as Advanced Textile Testing Techniques, Handbook of Nonwovens (2nd Ed.), etc. for wider access to the literature. The content and description of the study courses are relevant, regularly updated, and fully complies with the goals of the study programme, and ensure the achievement of the learning outcomes. In addition, the content of the study programme is regularly updated to meet the needs of the labor market and the latest trends in the industry. All changes are discussed and approved in the committee of the study field "Manufacture and Processing" and submitted for approval to the Council of FMSAC and further in accordance with procedures by RTU. The academic staff of the study programme update and implement their study courses in consideration of topicalities in the national economy of Latvia and globally, regular students' surveys on the study courses, recommendations of employers about the skills, knowledge, and competence important for the labor market and all advisory boards. From SAR it is visible that in 2016 the module of 6 CP "Innovative Product Development and

Entrepreneurship” was incorporated in the study programme, whose content covers the competencies of business, transfer of technologies, and product development. In addition, three study courses were excluded from the study programme, and the study course “Textile and Clothing Research Methods” was introduced as the replacement of the basic research study courses delivered separately for different specializations “Methods and Facilities for Research” and “Clothing research methods”. The volume of internships was reduced from 26 CP to 20 CP and two new study courses “Fundamentals of Garment Patternmaking and Technology” and “Basic Principles of Textile Technologies” were introduced in the study programme as compulsory professional specialization courses allowing getting knowledge of the basic processes in specializations in the beginning stage of the studies. The study course “Sourcing of Clothing Materials” was replaced with courses for specializations “Clothing Material Development” and “Technical textiles”, and mathematics study courses was reduced from 13 CP to 7 CP to implement study courses “Mathematics” of 5 CP and “Probability Theory and Mathematical Statistics” of 2 CP. The study courses “Fundamentals of Fine Arts” and “Production of Nonwovens” were introduced in the study programme, and in 2020 the study course “Environment and Climate Roadmap” of 1 CP was introduced as a replacement for the study course “Basics of Occupational Safety”. The study course “Sport Activity” was excluded from Part A of the study programme and became a free elective study course.

The experts’ group highly appreciates the regular update of the programme, which is also reflected in general in the satisfied students, graduates and students’ employers. Namely, during the experts’ visit, students showed high satisfaction with the study programme (gained theoretical and practical knowledge) and motivation for the studies but emphasize the desire for more creative study courses and especially the need to learn to work with CAD PDS software used by the industry. The latter was also pointed out by the graduates. The employers of students stated that the basic skills of students are at a high level, and they know how to think creatively, operatively, they are systematic, reliable, and responsible.

The goal of the study programme is closely linked with the defined learning outcomes of the study programme, which should be achieved during the acquisition of the study courses. This link between study courses and the study results of the study programme is reflected by the mapping of the study courses in the SAR in Annex 1.2. The study process provides progressing from general study courses of the higher education and the study courses of the basics of the industry materials and technologies to more complicated technologies, computer-aided design of products, design, and organization of manufacturing processes, as can be seen in the plan of implementation of the study programme attached in Annex 2.2.

In general, the content of the study programme and study courses meets the needs of the relevant industry and the scientific trends.

The study methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and study programme overall. The study process is organized in the form of lectures, laboratory work, and practical work to provide both theoretical and practical knowledge to students. The study implementation methods are diverse: lectures, seminars, laboratory, and practical work, presentation, individual and group work, discussion, case studies, guest lecturers, and study excursions to companies. Different methods are chosen depending on the study course content and specifics. In the study courses “Innovative Product Development and Entrepreneurship” and “The Development of Industrial Clothing Collections” students work in groups and develop a joint project, which helps to develop various skills.

According to the SAR, the implementation methods for the study process consider the principles of student-centered learning and teaching, such as (a) the diversity of students and their needs are taken into account by creating appropriate ways of learning; (b) various forms of implementation of the study programme are used; (c) according to students’ abilities and needs, the academic staff applies diverse teaching methods and encourage a student’s to be independent, at the same time providing the leadership and support by the academic staff; (d) the process of a studies promotes

mutual respect in the relationship of students and the academic staff because the principle of democracy is followed and the administration of the study programme takes into account the students' opinion. This is also reflected in the descriptions of study courses. Every study year students have had an opportunity to listen to at least one guest lecture.

During the experts' visit in discussion with students and graduates, they exposed that they want more practical and group work, which can only further improve their learning outcome. None of the students are involved in research projects, that are many times exposed in the SAR. The teaching staff said that they include students in the research projects only during the performing of the graduation thesis. Experts suggest that the possibility of participating in research projects would be given to other students who want to gain additional knowledge, experiences, and competencies in this way. Students would like to go to fairs and would like to receive information about national and international fairs. Financing of fairs is on the side of students, therefore, it is suggested that academic staff find possibilities of financing.

The forms, terms, and requirements of interim tests and final tests are explained to students in the first lecture of the study course and published in the ORTUS (Moodle) system under descriptions of study courses and on the sites of study courses, which students confirmed during the experts' visit. There are tests in every study course (where the volume is a minimum of 2 CP) - tests, laboratory assignments, practical assignments, and other forms of examination of knowledge suitable for the specifics of the study course. Students have no comments on the assessment. The Department of Clothing and Textile Technologies twice a year discuss the results of the assessment of the knowledge of the students and also the progress of graduation projects of the 4th year students are discussed every month, together with results of students' surveys it serves for further improvement of the study process.

The practical placement of 20 CP is provided within the professional Bachelor's programme in compliance with Cabinet Regulations No. 512 "Regulations regarding the State Standard for the Second-Level Professional Higher Education Regulations on the national standard of the second level professional higher education" (adopted on 26 August 2014). Until 1 July 2019 the practical placement was implemented in compliance with the regulations approved by the Senate of RTU on 29 March 2010, and from 2019 it is done in compliance with the Resolution of the Senate of RTU of 28 January 2019 (Minutes No. 626) and according to the regulations of the structural unit implementing the study programme. The description of practical placement is included in the RTU Register of Study Courses (Annex 2.4). The goal, tasks and planned learning outcomes of the practical placement are related to the overall goal of the study programme and the learning outcomes to be achieved within the study process (Annex 1.2), while the DCTT has also developed the Methodological Guidelines on Practical Placement. Practical placement is organised in two parts: (a) first part of 9 CP is provided to students led by the practical training academic staff in the IDT training workshops and (b) second part of 11 CP is performed at manufacturing companies. The practical placement for foreign students is the same as for Latvian students (in Latvia, abroad, home country).

The outcomes of the surveys conducted among the students, employers, and graduates are used to constantly improve the quality of the study courses. The students are surveyed twice a year - after each semester. Surveys include questions regarding accessibility of study materials for each study course, the professor's assessment criteria, work culture, and quality, compliance with the students' rights during the classes, the time devoted to the student's independent work, and studying the discipline. The concluding part of the questionnaire is intended for students' suggestions and recommendations for improvement of the quality of the study course and the professor's work. During the visit, an experts' group found that teachers regularly use not only formal surveys among students but also informal conversations with students to improve the quality of the study course. Students also confirmed that their opinions and wishes, especially concerning the implementation of individual subjects by the informal conversation with pedagogical staff, have been considered,

sometimes as early as the next semester.

The results of the survey of students of the study programme "Clothing and Textile Technology" in Latvian (Annex 2.6.) show that most students are satisfied with the content of the study programme, the theoretical and practical skills acquired in the result of completing it, as well as the classrooms and technical equipment, the schedules of classes, availability of the study literature, the RTU infrastructure, and international cooperation. Less than half of the students' respondents completed the survey. The response of the graduates to the survey has been from 62% up to even 100% in the analyzed period (Annex 2.7). The summary of the graduates' answers leads to the conclusion that a majority of graduates (68-78%) are satisfied with studies at RTU and with the selected study programme, the theoretical and practical knowledge provided therein, and 73% of graduates would recommend this study programme to others. The 5 employers out of 21 employers completed the survey (Annex 2.8). Employers are satisfied with graduates of the study programme, and describe them as employees with a high level of theoretical and practical training background and ability to work in a team. The majority of respondents state that they were not involved in the development of the study programme due to being busy. Their recommendations encourage the lecturers of IDT to continue cooperating with the industry professionals for the improvement of the quality of studies. The results of surveys of students and employees highlight the need to improve the obtaining of opinions through surveys to continuously improve the quality of the studies.

The results of the survey of students of the study programme "Clothing and textile technology" in English (Annex 2.6) carried out 3 students and 3 answers were received of which 2 of the students were in the 2nd year and one was in the 1st year. Therefore, it is difficult to receive an objective assessment from them. Students' satisfaction with the study programme, the theoretical and practical knowledge provided, the available literature, and the schedule of classes is average. The results of the graduates' survey on the study programme in the last eight years (Annex 2.7) show they are in general satisfied with the selected study programme, and received theoretical and practical knowledge, and recommend considering upgrading of the workshop equipment and supplementing of IT software in particular, in the direction of the textile technology.

In Annex 2.8. results of the employers' survey show that only a small number of companies replied to the questionnaire (5 of 21) and highlight the need to improve the obtaining of opinions through surveys by employers. Employers described that graduates as employees have a high level of theoretical and practical training background and ability to work in a team.

From the interviews with employed graduates in the surveyed companies, it was evident that only some of them receive the survey questionnaires directly, while others indirectly. In addition, experts noted that a reverse feedback mechanism from the management and academic staff to the major stakeholders (students and employers) about the changes made based on the summary of the surveys have not been established.

The students have an opportunity to study abroad through the Erasmus and other exchange programmes. According to the SAR, seven students have used Erasmus outgoing mobility in the reporting period, which indicates the necessary encouragement to mobility with reasoned advantages about gaining additional knowledge and experience. The system of study courses selection on the host faculty and recognition of the learning outcomes during mobility is well organized. Recognition of study courses completed during the mobility is done based on the order of the RTU Study Vice-Rector of 29 October 2014 No. 01000-1.1/240 "On amendments in the procedure of organisation of Erasmus+ student mobility" and order of 4 April 2016 No. 02000-1.1/29 "On the procedure of recognition of study courses completed at other higher education institutions and study programs". The SAR does not contain data on Erasmus incoming students' mobility.

During the visit, the expert group did not perceive any desire of the students for Erasmus mobility. According to the checked partner countries of the RTU, experts suggest to the Institute of Design Technologies to carry out within RTU more partner agreements with European universities/faculties connected to the study field and study programmes to enhance students' mobility to gain additional

knowledge, experience, and competencies of students.

### **Conclusions by specifying the strengths and weaknesses**

The content and description of the study courses are relevant, and fully complies with the goals of the study programme and ensure the achievement of the learning outcomes. The implementation methods for the study process consider the principles of student-centered learning. The amount of study literature is very extensive for some study subjects, so it is necessary to specify which literature is mandatory and which is recommended. The recent literature should be included in some study courses, and for some study courses also in the RTU library, if it is not in e-sources. The content of the study programme is regularly updated to meet the needs of the labour market and the latest trends in the industry. The study methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and study programme overall. The responsiveness of the surveyed students to the study programme and study subjects is poor, also the contact with graduates and employers could be better for greater responsiveness to surveys. Erasmus outgoing mobility of students is very low, while there is no data about incoming mobility.

#### **Strengths:**

1. The content of the study programme is regularly updated and improved to cover the latest scientific trends and meet the needs of the relevant industry.
2. The study implementation methods are diverse and chosen consistent with the study course content and specifics.
3. The outcomes of the surveys conducted among students, graduates and employers are used to improve the quality of studies.

#### **Weaknesses:**

1. Literature in some study courses is very extensive and requires an indication of the required and additional literature.
2. No structured formal feedback to the major stakeholders (students and employers) on the content of the study programme.
3. Low student exchange in the context of Erasmus outgoing mobility and no data about incoming mobility.
4. Not enough creative study courses and there is a need to include a course on CAD PDS software that is widely used in the industry.
5. Not enough response to surveys of students, graduates, and employers.

### **3. Resources and Provision of the Study Programme**

#### **Analysis**

The professional bachelor's study programme "Clothing and Textile Technology" has been implemented in the newly built building of IDT since 2013 - Ķīpsalas 6, Riga. All classrooms are equipped with multimedia equipment.

The study programme uses laboratories and workshops, 9 IT laboratories with a total useful area of 493.4 sqm (SAR p.121-124):

- CAD / CAM laboratory for clothing and textile design (53.5 m2)
- Modeling and design laboratory (79.7 m2)
- Materials Science laboratories (59.1 m2 and 77.1 m2)
- Sewing Machine Mechanics and Embroidery laboratory (46.8 m2)
- Anthropometry laboratory (51.8 m2)

- Measurement laboratory (21.6 m2)
- Textile Research laboratory (30.2 m2)
- Textile laboratory (73.6 m2)

Work premises (workshops) 5 pieces with a total useful area of 370.5 sqm (SAR p. 124-125):

- Sewing workshop (88.9 m2)
- Fashion Design workshop (156.8 m2)
- Batik workshop (11 m2)
- Weaving workshop (54.4 m2)
- Knitwear workshop (59.4 m2)

The sewing workshops are equipped with modern industrial sewing equipment for garments for tailors and movable stands.

The basic raw materials for laboratory and practical work are provided by IDT, but there are cases when the work in workshops takes place using private materials.

The RTU Scientific Library (SL) (<https://www.rtu.lv/en/studies/scientificlibrary>) is a library of national importance, which has acquired its status in the process of library accreditation. The SL provides the necessary information to ensure RTU study process and research activities, as well as provides a library, bibliographic, and information services to RTU students, academic and general staff. The Library holds more than 1.3 million printed documents and e-resources in RTU industry-specific databases. The Library stock is located at the Central Library, the Study Material Subscription, the Chemistry Branch, the Transport Branch, and Study and Research Centres in Daugavpils, Liepāja, Cēsis, and Ventspils. At the request of the academic staff of the study field “Manufacturing and processing”, 91 new books were purchased by the SL amounting to 6932.28 EUR in the period of 2013 – 2020. (SAR p.57). 42 of them belong to the specialization direction “Clothing and Textile Technology” (SAR p.126). Both the electronic catalog and RTU portal ORTUS can be used to reserve the library resources remotely. Remote access to databases is also provided. Since the introduction of RFID technology, users have been able to use five book-dispensing self-service vending machines and return books to a book-sorting vending machine around the clock. Students have at their disposal the RTU Scientific Library which subscribes to more than 20 databases. (SAR p.126) for example ACM Digital Library; ProQuest, Ebook, Web of Science, etc.

RTU IT User Support Centre regularly organizes training on IT systems and the latest technology tools for RTU academic and general staff. Training is organized on the following topics: e-learning environment (Moodle) for beginners; e-learning environment (Moodle) for advanced users; MS Outlook email and calendar; Office365 Teams and OneDrive; searching in subscribed databases; record-keeping systems; basic IT security issues working with RTU information systems.

Students are provided with the necessary MS Office and AutoCAD specialized computer programs for mastering the study programme.

Other elements of RTU infrastructure are also available for the needs of students and lecturers - canteens and cafes, photocopiers, student hotels, RTU sports and recreation centers, swimming pools.

IDT funding has been stable over the last three years and is on the rise. The increase in funding compared to the previous year (2018/2019) is 9.47%. (SAR p. 46)

Statistical data on foreign students in 2018/2019 and in 2019/2020 shows that in this period 4 and 5 students studied in bachelor's studies, respectively (Appendix 10) The number of students in the current study year is 63, the expected graduates are 17.

At the request of the academic staff of the specialization field “Clothing and Textile Technology”, 42 new books were purchased by the SL amounting to 3956.42 EUR in the period of 2013 - 2020. At the request of the academic staff of the specialization field “Material technology and Design”, 49 new books were purchased by the SL amounting to 2975.86 EUR in the period of 2013 - 2020. (SAR p.57) This means that an average of 13 books were purchased each year between 2013 and 2020. Compared to the total amount of 1.3 million printed documents in SL funds (SAR p. 56).

During our visit, experts were able to make sure that the spacious study rooms provided to the students are well-equipped with ergonomic work desks, interactive whiteboards and intermedia systems. Students have at their disposal a computer class with the latest generation of stationary computers and large monitors. Excellent material and technical base with a wide range of well-equipped infrastructure (lighting, heat, ventilation) have been created for the implementation of the programme for laboratory work and practical work. The main machinery is equipped with the necessary accessories and cutting tools. Students have access to a good base of hand tools.

### **Conclusions by specifying the strengths and weaknesses**

The study provision, scientific support, informative provision, material and technical provision, and financial provision comply with the specific features and conditions for the implementation of the study programme, create the prerequisites for the achievement of the learning outcomes. The study provision and scientific support, establish the prerequisites for the achievement of learning and research outcomes, and indicate the possibility to ensure a high-quality study process .

Strengths:

1. Excellent material and technical base.
2. Well-equipped laboratories and workshops.
3. The programme has a stable upward budget.

Weaknesses:

1. The share of external income in the amount of funding for the study programme is very small.
2. The issue of centralized procurement of materials for laboratory practical work has not been resolved.
3. Insufficient practice in identifying and implementing the latest industry software programs in the learning process.

## **4. Teaching Staff**

### **Analysis**

32 members of the academic staff are involved in the implementation of the study programme "Clothing and Textile Technology", in particular, 14 from the institute itself and 18 from other RTU structural units. There have been some changes in the composition of academic staff members for this programme, but as a result of those, highly qualified teachers and researchers have been attracted to the implementation of this study programme (SAR, p. 129, Annex 6). Compared to the year 2013/2014 the academic staff's average age has decreased by 3,5 years (SAR, p. 128). RTU also makes sure that the generational change does not have an impact on the quality of studies by selecting and nurturing new academic staff members from the pool of existing students. Examples are given in the SAR, p. 129., where two young scientists and associate professors are mentioned to have "grown-up" in the institute. Taking into account all of the previously mentioned, in experts' opinion, there are no visible risks in the structure of the teaching staff and the possible negative effects are targeted efficiently.

Among the 32 academic staff members involved in the implementation of this programme 8 are professors, 8 associate professors, 8 assistant professors, 2 practical assistant professors, 2 lecturers, 1 assistant, 1 leading researcher, 1 researcher, and 1 research assistant (SAR, p. 127). The percentage of the academic staff members who possess Ph.D. degrees has risen from 62% to 80%, therefore the experts can deduce that the increase in academic staff qualifications is



something the university strives for. (SAR, p. 127). Based on the information provided in SAR from pages 130.-139., as well as Annex 6 (CV's of academic staff members), the experts are convinced that the qualifications of the teaching staff members comply with the requirements for this study programme and regulatory enactments. For the academic staff members who implement their courses in English, the language level is adequate (Annex "Macibspeki\_Teaching\_staff"). Experts were assured of the quality of English level during the onsite visit - the overall level of spoken English was good.

There is a visible contribution of the teaching staff in the research in the field of clothing design and technologies. The relevant publications and artistic work provided to experts are published in journals cited in Scopus or WoS. From the information available to the experts 313 out of 345 scientific publications are indexed in WoS and/or Scopus from the year 2013 until 2021, the average being 40 indexed publications per year within all of the academic staff members (SAR, Annex 8 "Publications\_patents"). Additionally, there are 55 publications in conference proceedings, which are also indexed by the WoS and/or Scopus (SAR, Annex 8 "Publications\_patents"). There are a couple of publications found in the aforementioned annex, which has 20-30, reaching up to even 70 citations in both - Scopus and WoS databases. As most (around 90% - SAR, Annex "Macibspeki\_Teaching\_staff") of the academic staff members involved in the implementation of this programme are also involved in the implementation for the other BSc programme, as well as MSc and Ph.D. programmes it is impossible to separate the involvement in scientific research specifically for teachers involved in the BSc programme "Clothing and Textile Technology". An example was found with one academic staff member, who teaches Sociology and Politology only for the two BSc programmes - 3 publications in local journals were found by the experts from the period of 2013 till 2021 (SAR, Annex 8 "Publications\_patents"). The number of the Scopus/WoS indexed publications is good, however, there are still 121 publications in the RTU scientific journal and RTU press (RTU conference proceedings) (SAR, Annex 8 "Publications\_patents"). The publication amount increase on an international level within journals with Scopus and/or WoS index would be beneficial for the university in the future. Ideally, the Scopus and/or WoS indexed publications should be double the amount published in the local journals and RTU press. The research done by academic staff allows continuous improvement of the quality of the study work by incorporating the most recent research results in study courses. The obtained experience and knowledge allow improving the competencies of professors, as well as provides an opportunity to enrich the discussions in the classroom and to provide knowledge on topical issues in the global textile industry to students (SAR, p.140). During the onsite visit, an example was provided: some study courses (such as smart clothing) were created based on the scientific research of the relevant academic staff.

Academic staff members from the Faculty of Engineering Economics and Management, the Faculty of Computer Sciences and Information Technology, the Faculty of Architecture, the Faculty of E-studies and Humanities Sciences, the Faculty of Electrical Engineering and Environment Engineering participate in the implementation of the study programme. This approach provides the interdisciplinary nature of the study programme. In selecting and involving the academic staff, the study programme management aims to achieve the highest possible efficiency of the study programme and to provide an opportunity for students to achieve the envisaged learning outcomes (SAR, p. 130). The academic staff members have regular meetings to talk through the course contents, suggest some changes as well as make sure that the course contents do not overlap. There is a good collaboration between the teaching staff, and between the director of the programme as it was deduced during the onsite visit meetings. Examples were given about the mechanisms of cooperation, specifically, about one professor who had problems with distance learning, hence it was solved by arranging extra help for the professor in question.

## Conclusions by specifying the strengths and weaknesses

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The qualifications and research records of the academic staff members are on an adequate level. The involvement of the academic staff in research projects is at a satisfactory level, but the international involvement might be improved. There are good collaboration mechanisms in place between the academic staff members.

Strengths:

1. Increasing percentage of academic staff members, who possess Ph.D. degrees.
2. The problem of generational change is solved by nurturing new academic staff members from a student age within the institute.
3. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

Weakness:

1. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.

## 5. Assessment of the Compliance of the Study Programme "Clothing and Textile Technology"

### Requirements

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

**Assessment of compliance:** Fully compliant

The diploma sample provided in SAR fully complies with the procedure and regulations by which Latvian state-recognized documents of higher education are issued (Cabinet Regulations No 202).

The introductory paragraph in the Diploma Supplement provided in English should be reviewed and aligned with the Cabinet Regulations No 202, however, as it is a purely technical discrepancy with a few words being different, in experts' opinion, it does not affect the overall assessment of this criteria.

2. Documents confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued.

**Assessment of compliance:** Partially compliant

Full compliance can be found in the agreement with the Latvia University of Life Sciences and Technologies for the programme "Design and crafts" (Annex "Vienosānās\_LLU un RTU\_2020"). However, it should be taken into account that LLU offers this study programme only in Latvian (information from LLU website 22.12.2021. <https://www.llu.lv/en/bachelor-study-programmes>), which means that for RTU foreign students there wouldn't be an opportunity to continue studies in this programme.

3. Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme.

**Assessment of compliance:** Fully compliant

Full compliance can be found in RTU Rector's confirmation (SAR, Annex "On compensation of losses in case the study program is not accredited, or the license of the study program is revoked, and a student does not wish to continue studies in another study program", document No 01000-2.2.1-e/178)

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

**Assessment of compliance:** Fully compliant

The academic staff's official language knowledge fully complies with the Cabinet of Ministers Regulation No. 733 of 7 July 2009 "Regulations Regarding the Extent of the Knowledge of the Official Language, the Procedures for Examining the Proficiency in the Official Language and the State Fee for Examining the Proficiency in the Official Language" (SAR, RTU Vice-Rector's for Academic Affairs confirmation, annex "On the knowledge of the state language of the teaching staff involved in the implementation of study programs corresponding to the study direction "Manufacture and Processing", document No 02000-2.2.1-e/95)

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

**Assessment of compliance:** Fully compliant

Full compliance can be found in RTU Vice-Rector's for Academic Affairs confirmation (SAR, Annex "On the foreign language knowledge of the teaching staff involved in the implementation of study programs corresponding to the study direction "Manufacture and Processing", document No 02000-2.2.1-e/97).

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully compliant with Cabinet regulations No 70 "Mandatory Provisions to be Included in the Study Agreement" (SAR, Annex "Sample of Study Agreements")

- 9 9. The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Institutions of Higher Education.

**Assessment of compliance:** Partially compliant

Study course descriptions are generally in compliance with the Law on Institutions of Higher Education Section 561, Paragraph two. They have been prepared in all languages in which the study programme is implemented. However, for some study course descriptions, for example, but not only, MVR527, ATM205, and BTG131 lack in the division of recommended literature between the obligatory and additional is observed.

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

**Assessment of compliance:** Fully compliant

Full compliance of the professional Bachelor's study programme "Clothing and Textile Technology" with the currently valid professional standard for Engineer in Clothing and Textile Production. Although it is technically compliant, in experts' opinion this professional standard is quite out of date and therefore the university could encourage the sectoral councils work on a new professional standard for this qualification. When the new professional standard is approved, RTU needs to update the study programme in accordance with the new professional standard within six months after its publication on the website [www.visc.gov.lv](http://www.visc.gov.lv).

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully complies with the State Professional Higher Education Standard (Cabinet Regulations No 512). (SAR, Annex 2.1. Compliance of the Professional Bachelor's study programme "Clothing and Textile Technology")

- 13 13. The joint study programmes comply with the requirements prescribed in Section 551, Paragraphs one, two, and seven of the Law on Institutions of Higher Education (if applicable).

**Assessment of compliance:** Not relevant

- 14 14. Each member of the academic staff has either publications published in reviewed editions within the last six years, including international editions (if they have worked for a shorter period of time, the number of publications shall be in proportion to the work period), or artistic creation achievements (for instance, exhibitions, films, theatre performances, and concert activity), or a five-year practical work experience (except for the experience in the implementation of the study programme) in accordance with the Law on Institutions of Higher Education.

**Assessment of compliance:** Fully compliant

Justification can be found in SAR, Annex 8 (Annex\_8\_Publications\_Creative\_work).

- 15 R5 - Overall rating

**Assessment of compliance:** Partially compliant

The study programme mostly, but in one aspect still partially, complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. See more in recommendations regarding this study programme.

**Requirements (R6-R8)**

- 1 R6 - The compliance of the 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 ensuring the achievement of the learning outcomes.

**Assessment of compliance:** Fully compliant

The provision of the study programme is fully sufficient for the scientific support and informative provision for the implementation of the study programme and ensuring the achievement of the learning outcomes.

- 2 R7 - The compliance of the qualification of the academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments.

**Assessment of compliance:** Fully compliant

The qualifications of academic staff members involved in the implementation of this study programme are fully compliant with the conditions for this study programme as well as the respective regulatory enactments. For more detailed analysis please see chapter 4 of this study programme.

- 3 R8 - The study programme leading to the master or doctoral degree is based on the advances and findings in the relevant field of science or artistic creation.

**Assessment of compliance:** Not relevant**Conclusions by specifying the strengths and weaknesses**

The study programme prescribes the acquisition of both the corresponding professional Bachelor's degree and the professional qualification.

The content and description of the study courses are relevant, and fully complies with the goals of the study programme and ensure the achievement of the learning outcomes. The amount of study literature is very extensive for some study subjects, so it is necessary to specify which literature is mandatory and which is recommended. The content of the study programme is regularly updated to meet the needs of the labour market and the latest trends in the industry. The study methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and study programme overall. The responsiveness of the surveyed students to the study programme and study subjects is poor, also the contact with graduates and employers could be better for greater responsiveness to surveys. Erasmus outgoing mobility of students is very low, while there is no data about incoming mobility

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The qualifications and research records of the academic staff members are on an adequate level. The involvement of the academic staff in research projects is at a satisfactory level, but the international involvement might be improved. There are good collaboration mechanisms in place between the academic staff members.

The provision of the study programme is completely sufficient for obtaining the corresponding

professional bachelor's degree and professional qualification.

**Strengths:**

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.
3. The content of the study programme is regularly updated and improved in order to cover the latest scientific trends and meet the needs of the relevant industry.
4. The study implementation methods are diverse and chosen consistent with the study course content and specifics.
5. The outcomes of the surveys conducted among students, graduates and employers are used to improve the quality of studies.
6. Increasing percentage of academic staff members, who possess Ph.D. degrees.
7. The problem of generational change is solved by nurturing new academic staff members from a student age within the institute.
8. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.
9. Excellent material and technical base.
10. Well-equipped laboratories and workshops.
11. The programme has a stable upward budget.

**Weaknesses:**

1. Some study course descriptions do not have the division of literature in obligatory and additional literature.
2. The SAR program does not include information on the draft new professional standard. Currently, work is underway on the new professional standard, which corresponds to the professional qualification awarded to the graduates of this study programme. The management of the study programme must be ready to make the necessary changes in the study programme, ensuring its compliance with the new professional standard.
3. No structured formal feedback to the major stakeholders (students and employers) on the content of the study programme.
4. Low student exchange in the context of Erasmus outgoing mobility and no data about incoming mobility.
5. Not enough creative study courses and there is a need to include a course on CAD PDS software that is widely used in the industry.
6. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.
7. There are some technical discrepancies with the Cabinet Regulations No 202, in the diploma supplement provided to the experts.
8. The share of external income in the amount of funding for the study programme is very small.
9. The issue of centralized procurement of materials for laboratory practical work has not been resolved.
10. There is no agreement with the university, which in case RTU stops implementing this study programme, would be ready to take over foreign students.
11. Not enough response to surveys of students, graduates, and employers.

**Evaluation of the study programme "Clothing and Textile Technology"**

Evaluation of the study programme:

## 6. Recommendations for the Study Programme "Clothing and Textile Technology"

### Short-term recommendations

1. Agreements need to be reached with leading industry companies on a centralized supply of materials for laboratories and workshops in a period of a year.
2. Practice in identifying and implementing the latest industry software programs in the learning process should be introduced in a year.
3. Until the hearing of the Study Quality Committee review of the study course descriptions is needed to separate recommended literature between obligatory and additional.
4. Until the hearing of the Study Quality Committee the issued diploma supplement should be reviewed and aligned with the Cabinet Regulations No 202.
5. During the 6 months after the new professional standard publication RTU needs to make necessary changes and improvements in the content of this study programme.
6. Add more creative study courses and include a course on CAD PDS software that is widely used in the industry in a period of a year.
7. Within two years, sign an agreement with another university, which, in case RTU terminates the study programme, would be ready to take over foreign students.

### Long-term recommendations

1. Until the next accreditation, the number of publications in international Scopus/WoS indexed journals should be increased, ideally so it would double the publications in local/RTU press scientific journals.
2. During the next four years the share of external revenue needs to increase to relieve part of the basic budget.
3. During the next four years need to establish formal feedback from the major stakeholders (students and employers) on the content of the study programme.
4. Updating curricula and library collection with recent literature.
5. Incoming and outgoing students' mobility needs to be increased.
6. The response to surveys of students, graduates, and employers needs to be increased.

## II. "Material Technology and Design" ASSESSMENT

### II. "Material Technology and Design" ASSESSMENT

#### 1. Indicators Describing the Study Programme

##### Analysis

The name of the professional bachelor's degree study programme "Material Technology and Design" (42548) corresponds with the evaluated study field "Manufacture and Processing". The aim of the study programme is "provision of competitive professional higher education of 6th LQL/ 6th EQL and

the fifth level and training of students for work in the field of design and technologies by specializing in the development, design, and materialization of new materials, multifunctional, environmental items of a high aesthetic and ergonomic value, consumption products and their collection concepts" is clearly defined. The aim and the tasks of the study programme comply with the learning outcomes, as well as the admission requirements are appropriate. The learning outcomes, aims and tasks correspond with all 3 specialization. Graduates receive a Professional bachelor's degree in materials technology and design and Professional Qualification Product designer.

Admission of applicants to the full-time basic study programme in Latvian is done based on general or vocational secondary education. The admission requirements of the study programme correspond with the bachelor study programme entrance requirements and are in line with Articles 46 and 47 of the Law on Higher Education Institutions and the Cabinet Regulations No 846 "Regulations Requirements, Criteria and Procedures for Admissions to Study Programmes" of 10 October 2006.

The content of the study programme consists of three specialties: 1) Textile design and technology 2) Clothing design and technology 3) Wooden products and interior design technologies. According to the appendix "Study program plan" attached to SAR for each of the specialties Part B COMPULSORY ELECTIVE STUDY COURSES are provided for 52 CP. The study courses included in these credit points reflect the chosen specialization and are in accordance with the objectives of the study programme and promote the achievement of the results of the study programme.

The professional standard "Product Designer" is included in the industry map (art and design) (LQF level 6) ([https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK\\_maksla.pdf](https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK_maksla.pdf); is included in the Cabinet Regulation No. 626 (<https://likumi.lv/ta/id/302154-noteikumi-par-obligati-piemeramu-profesiju-standartu-un-profesionalas-kvalifikacijas-prasibu-sarakstu>

Full compliance of the professional Bachelor's study programme "Material Technology and Design" with the currently valid professional standard for "Product Designer". Although it is technically compliant, in experts' opinion this professional standard is quite out of date and therefore the university could encourage the sectoral council to start working on a new professional standard for this qualification. When the new professional standard is approved, RTU needs to update the study programme in accordance with the new professional standard within six months after its publication on the website [www.visc.gov.lv](http://www.visc.gov.lv).

## **Conclusions by specifying the strengths and weaknesses**

The study programme prescribes the acquisition of both the corresponding professional Bachelor's degree and the professional qualification.

Strengths:

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.

Weakness

1. The programme SAR does not include information on the draft of the new professional standard.

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

### **Analysis**

The professional bachelor study programme "Material Technology and Design" is implemented by the Institute of Design Technologies (IDT) of the Faculty of Materials Science and Applied Chemistry (FMSAC) at the Riga Technical University. The professional standard "Product Designer" is included



in the industry map (art and design) (LQF level 6) ([https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK\\_maksla.pdf](https://registri.visc.gov.lv/profizglitiba/dokumenti/nozkval/NKSK_maksla.pdf); is included in the Cabinet Regulation No. 626 <https://likumi.lv/ta/id/302154-noteikumi-par-obligati-piemeramu-profesiju-standartu-un-profesionalas-kvalifikacijas-prasibu-sarakstu>- Work is currently underway to develop a new standard, therefore, the RTU will need to ensure that the programme complies with the newly approved standard.

The study programme consists of 160 CP. The mandatory content of the study programme consists of: (1) study courses: compulsory part (A) of 62 CP, restricted choice part (B) of 60 CP, elective part (C) of 6 CP, (2) internship (D) of 20 CP, and (3) the State/Final Examination, a part of which is elaboration and defense of a Bachelor thesis (E) of 12 CP. Part B is divided on Part B1 of 52 CP, which offers field-specific study courses for each of the three specializations: Textile design and technology, Clothing design and technology, and Wood product and interior design technologies; whilst Part B2 offers humanities and social sciences study courses of 4 CP and Part B6 languages of 4 CP. The content of the study programme complies with the requirements of the Cabinet Regulations of the Republic of Latvia No. 512. Assessment of conformity to the standard is attached in Annex 6., which reflects that all three specializations can fulfill requirements of professional standard. In addition, with study courses of 52 CP for each of three specializations requirements of the professional standard can be fulfilled.. In addition to the Professional bachelor degree, the professional qualification "Product Designer" is awarded at the end of the study programme. Therefore, the study programme is also harmonized with the standard of the relevant profession "Product Designer". Annex 7 shows a comparison of the study programme with the requirements of the professional standard.

As can be found in the SAR, the content of the study programme is continuously renewed and improved according to the recent trends in the sector of light industry and wood industry, the area of product design, the national economy, and regional development, considering the situation and requirements in the labor market. Namely, according to the "Report on the Implementation of Recommendations", changes were made in the period 2013 - 2020 based on feedback from student surveys, which improved the methodology and teaching methods. The elective study courses "Art Composition and Shapes. Shape Formation", "Color and Shape Logic", "Design of Work Processes", "Art Pedagogy", "Interior Project Management", "Design Analysis and Criticism", "Introduction to Design Theory", "Art and Functionality of Interior Design" were upgraded and new study courses were added: "Finishing of Wooden Products", "Manufacture of Upholstered Furniture", "Planning of Industrial Collections", "Apparel Designing with CAD-CAM system LECTRA", "Development of Innovative Products and Entrepreneurship", "Basics of Apparel Visual Art", "Interior Architecture". In addition, teaching aids and resources are supplementing and updated every year, their lists and lecture presentations are placed on the ORTUS (Moodle) platform and are available to students throughout the study period. Teaching methodology includes methods for efficient studies, such as group work, involvement in project planning and implementation, cooperation with industry representatives, and guest lectures by industry representatives.

The link between study courses and the study outcomes of the study programme is given by the mapping of the study courses, which is attached in Annex 8, and with a plan of the study programme attached in Annex 9. Descriptions of study courses included in the professional Bachelor's study programme "Materials technologies and design" are attached in Annex 10, containing descriptions of 23 compulsory study courses and 48 restricted choice study courses. The study courses are relevant, comply with the aims of the programme and ensure that the graduates acquire required skills, competencies, and knowledge, and meet the needs of the relevant industry and the scientific trends, which can be seen, for example, in study courses Basics of Materials Science, Analysis of Woven Fabric Structures, Textile Physics, etc. More recent study literature is seen in most curricula, while for some study courses literature is given very extensively and without citation of obligatory and additional literature, as can be seen in study courses Ornament, Textile

Physics, Design of Clothing Collections, Analysis of Woven Fabric Structures. For subjects from the fields of product design and development, garment patternmaking, information technology, graphics, furniture design, etc. the recent literature is not observed in the curricula (e.g. Innovative Product Development and Entrepreneurship Information Technology, Information Technology), and for some also in the RTU library (e.g. Fundamentals of Graphical Analysis, Applied Graphics, Furniture Design). In addition, the academic staff ensures that they incorporate into the curriculum the suggestions and comments made by students and employers. This was also confirmed in an interview of an expert group with students and graduates. During the experts' visit, students expressed high satisfaction with the study programme and gained good basic theoretical knowledge and practical skills through the study process and internship. In addition, they expressed great satisfaction with the faculty laboratories, their equipment and that they very liked to work there. From the interview with the students, experts conclude that they are very motivated to study. However, they emphasized the desire for more creative study courses with more design, group work, and especially the need to learn to work with CAD PDS software used by the industry. They also want to gain more knowledge about new materials and trends in their development. The latter was also pointed out by the graduates during an interview with experts, except those, which are more artistically oriented and continue their master studies at the Art Academy of Latvia. During meeting of experts with the employers of students they exposed that students as employees have basic skills at a high level, they think operatively and systematically, they are creative, accurate, and responsible. According to the above described the experts conclude that the study programme has highly motivated students with good basic knowledge and skills.

The study implementation methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and study programme overall. The study process is organized in the form of lectures, demonstrations, seminars, practical assignments, presentations, discussions, case analysis, and group work depending on the study course, as can be found in the SAR and for example in study courses MŠM110, SDD700, MVR724, AAR113, AAP714. In addition, design thinking methods and tools in the process of implementation of study courses are encouraged. In Annex 4.5.3 it can be seen that DTI DMTK organized seminars with guest lecturers - representatives of companies and practical training, excursions to companies, municipalities, exhibition warehouses - practical operation, students work on different projects and collaborations to undertakings of the branch, which provides additional knowledge to students, linking with the work environment of technologies and design. According to the SAR, the implementation methods for the study process consider the principles of student-centered learning and teaching, as can be seen on page 206 of the SAR, and every study year students have had an opportunity to listen to at least one guest lecture. In the SAR it is seen that both quality and quantity methods are applied for assessment of results: discussions, seminars, presentations, tests, assignments, practical assignments, laboratory assignments, and examinations; teaching staff independently develop the structure of assessment of a study course within their study courses. During the experts' visit students have no complaints about evaluation methods of the knowledge, whose information is received in the first hour of the first lecture.

The internship of 4 CP during the first study year in the laboratories of the Department of Design and Materials Technologies and the internship of 16 CP at the industry are well organized and conclude with a public defense of internship. According to the SAR, the Head of the Department approves the internship assessment commission consisting of a minimum of two members; i.e. academic staff of the structural unit is included in the commission, in some cases, representatives of the industry professional associations or employers are involved. However, the majority of the representatives of the structural unit are maintained. During the experts' visit, students had no comments on the internship and the entire internship process. The internship of the students of the specialization "Clothing Design and Technologies" takes place at the Fashion Design Master Workshop for a highly qualified professional fashion designer. Therefore, students go through all the stages of developing

and presenting a collection in practice in the third study year with a minimum of 5 garments and the fourth study year with a minimum of 7 garments (Annex 2.4.1). Numerous topics of the Bachelor thesis during the period from 2013 to 2020 and the average assessment of these graduation papers - 7.92 (Annex 2.5.1) reflect the goal of the study programme and envisaged results during the study process.

To obtain feedback, regular electronic surveys of students regarding the study content and the quality of work of the academic staff are performed. During the period from 16.09.2019 to 04.10.2020, only 43 students of the 159 enrolled in all four years of the study year 2019/2020 answered the questionnaire. The summary of students' questionnaires leads to the conclusion that students are generally satisfied with the study programme, as shown by all the questions asked (Annex 2.6.1). Namely, 56 % of the respondents have answered that they are fully or partially satisfied with the selected study programme. Moreover, in the 2nd year, 67 % are fully satisfied, in the 3rd year 53 % have expressed neutral assessment and in the 4th year, 54 % are partially or fully satisfied. In addition, 54 % are partially or fully satisfied with theoretical knowledge and 60 % with practical skills. 65 % of the students are partially or fully satisfied with the ratio of lectures and practical classes.

According to the SAR, the implementation methods for the study process consider the principles of student-centered learning and teaching, as can be seen on page 206 of the SAR: (a) the diversity of students and their needs is taken into account and respected by creating appropriate ways of learning; (b) according to students' abilities and needs, the academic staff applies diverse teaching methods and encourage a student's willingness to be independent, at the same time providing the leadership and support by the academic staff; (c) the process of a study course promotes mutual respect in the relationship of students and the academic staff because the principle of democracy is followed and the administration of the study program takes into account the students' opinion as far as possible. This is also reflected in the descriptions of study courses. Every study year students have had an opportunity to listen to at least one guest lecture.

In the period from June 2014 to June 2020 135 graduates of the study programme "Material Technologies and Design" were interviewed - 58% out of the total number of 231 (Annex 2.6.2.). The summary of students' questionnaires leads to the conclusion that graduates are generally satisfied with the study programme. Namely, on average 73 % of graduates state that they are satisfied (partially or fully) with the choice to study at RTU and 66 % are satisfied with their choice to study in the programme "Materials Technology and Design". In addition, 63 % of graduates consider that they are satisfied with the theoretical knowledge they have acquired and 55 % are satisfied with practical skills, 19 % and 21 % of the respondents have expressed neutral assessment accordingly. The ratio of lectures and practical classes has been considered optimum in 53 % of questionnaires and neutral opinion has been expressed in 21 % of questionnaires. However, they have more recommendations for improvement of the study process compared to students. Based on this (SAR), the study courses "Legal regulation of business operations" of 3 CP and "Economics" of 2 CP had been withdrawn from the study programme, and released credits have been used for incorporating new study courses in the study programme.

Twentythree employers who jointly employed 124 graduates have participated in the survey. The survey shows (Figure 2.1 of the SAR) that a majority of employers admit that graduates have good theoretical and practical knowledge background, they can perform work assignments immediately or following short training, they can work in a team, perform their obligations with a sense of responsibility and good quality. Employers' recommendations and comments are given in the SAR. However, in the SAR it is not clear how employers' comments in the questionnaires were considered to improve the study programme.

The students of the professional Bachelor's programme "Material Technologies and Design" have used the opportunity to supplement their knowledge within the Erasmus program by both studying at foreign education institutions and doing their internships abroad. As can be seen in the document

“Sudejoso\_mobilitate Students Mobility.pdf” two to three students per year and even five students in 2017/2018 have been taking advantage of outgoing Erasmus mobility. The study programme is provided only in Latvian, therefore, there is no incoming mobility of foreign students.

According to the SAR, the implementation methods for the study process consider the principles of student-centered learning and teaching, as can be seen on page 206 of the SAR: (a) the diversity of students and their needs is taken into account and respected by creating appropriate ways of learning; (b) according to students' abilities and needs, the academic staff applies diverse teaching methods and encourage a student's willingness to be independent, at the same time providing the leadership and support by the academic staff; (c) the process of a study course promotes mutual respect in the relationship of students and the academic staff because the principle of democracy is followed and the administration of the study program takes into account the students' opinion as far as possible. This is also reflected in the descriptions of study courses. Every study year students have had an opportunity to listen to at least one guest lecture.

### **Conclusions by specifying the strengths and weaknesses**

The content of the study programme is continuously renewed and improved according to the recent trends in the sector of light industry and wood industry, in the area of product design, the national economy and regional development, considering the situation and requirements in the labour market, which could be further improved by addressing the necessary CAD PDS programs and knowledge of new materials and student responses in the surveys. Numerous diploma thesis reflects the goal of the study programme and envisaged results during the study process. The study implementation methods are diverse and chosen according to the study course content and specifics. The outcomes of the surveys conducted among the students and graduates are used to improve the quality of studies. It is not clear how and whether employers' comments in the questionnaires were considered to improve the study programme. The students use the opportunity to supplement their knowledge within the Erasmus program by both studying at foreign education institutions and doing their internships abroad. Namely, two to three students per year and even five students in 2017/2018 have been taking advantage of outgoing Erasmus mobility. The implementation methods for the study process consider the principles of student-centered learning.

#### **Strengths:**

1. The content of the study programme is regularly updated and improved to cover the latest scientific trends and meet the needs of the relevant industry.
2. The study implementation methods are diverse and chosen according to the study course content and specifics.
3. The outcomes of the surveys conducted among students and graduates are used to improve the quality of the studies.
4. During the experts' visit, students expressed high satisfaction with the study programme and to gained good basic theoretical knowledge and practical skills through the study process and internship. In addition, they expressed great satisfaction with the faculty laboratories, their equipment and they very like to work in them. From the interview with the students we conclude that they are very motivated to study.

#### **Weaknesses:**

1. Literature in some study courses is very extensive and requires an indication of the obligatory and additional literature.
2. For subjects from the fields of product design and development, garment patternmaking, information technology, graphics, furniture design etc. the recent literature should be included in the

curricula, and for some also in the RTU library.

3. The low number of survey responses by students.

4. It is not clear how and whether employers' comments in the questionnaires were considered to improve the study programme.

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

#### Analysis

The professional bachelor study programme "Materials Technology and Design" is implemented in a modern newly built building - Ķīpsalas 6, Riga, where IDT is located together with the Faculty of Architecture and RTU Design Factory.

The provision with necessary resources of the study programme is appropriate for all 3 study specializations: 1) Textile design and technology. 2) Clothing design and technology 3) Wood products and interior design technologies. The basic raw materials for laboratory and practical work are provided by IDT, but there are cases when the work in workshops takes place using private materials.

Lectures take place at Ķīpsalas Street 6 in five auditoriums that are fully equipped with multimedia equipment and in two RTU-shared auditoriums.

Two specially equipped IT laboratories (SAR p.220) are used for the needs of the study programme:

- CAD / CAM laboratory for clothing and textile design (53.5 m2)
- Modeling and design laboratory (79.7 m2)

IT laboratories together with 37 (16 + 20 + 1) computers are equipped with workstations and are provided with general-purpose 2D and 3D design, calculation and image processing systems, and licensed application software.

Practical training is carried out in six specialized workshops: (SAR p.221-222)

- Wood technology and assembly workshop (375.4 m2)
- Sewing workshop (88.9 m2)
- Fashion Design Workshop (156.8 m2)
- Batik workshop (11 m2)
- Weaving workshop (54.4 m2)
- Knitwear workshop (59.4 m2)

Research laboratory work is carried out in three specialized laboratories: (SAR p.223-227)

- Knitwear and textile laboratory (73.6 m2)
- Materials, Technology and Design Laboratory (57.8 m2)
- Timber Research Laboratory (29.4 m2)

Scientific and technical laboratory works are carried out in twelve specialized laboratories:

- Woodworking laboratory working with hand tools (39.7 m2 and 16 m2)
- Layout and woodworking laboratory (17.9 m2)
- Sewing Machine Mechanics and Embroidery Laboratory (46.8 m2)
- Materials Science Laboratory (59.1 m2 and 77.1 m2)
- Anthropometry Laboratory (51.8 m2)
- Measurement laboratory ESM (16.7 m2, 38.4 m2)
- Measurement laboratory (21.6 m2)
- Textile Research Laboratory (30.2 m2)
- Timber Research Laboratory (27 m2)

Students are provided with the necessary MS Office, AutoCAD computer programs for mastering the study programme. Students and lecturers have the opportunity to use the free Wi-Fi system in all RTU premises.

The RTU Scientific Library (SL) provides the necessary information to ensure RTU study process and

research activities, as well as provides a library, bibliographic, and information services to RTU students, academic and general staff. The Library holds more than 1.3 million printed documents and e-resources in RTU industry-specific databases. The Library stock is located at the Central Library, the Study Material Subscription, the Chemistry Branch, the Transport Branch, and Study and Research Centres in Daugavpils, Liepāja, Cēsis, and Ventspils. At the request of the academic staff of the study field “Manufacturing and processing”, 91 new books were purchased by the SL amounting to 6932.28 EUR in the period of 2013 - 2020. (SAR p.57). Both the electronic catalog and RTU portal ORTUS can be used to reserve the library resources remotely. Remote access to databases is also provided.

IDT funding has been stable over the last three years and is on the rise. The increase in funding compared to the previous year (2018/2019) is 9.47%. (SAR p. 46)

At the request of the academic staff of the specialization field “Clothing and Textile Technology”, 42 new books were purchased by the SL amounting to 3956.42 EUR in the period of 2013 - 2020. At the request of the academic staff of the specialization field “Material technology and Design”, 49 new books were purchased by the SL amounting to 2975.86 EUR in the period of 2013 - 2020. (SAR p.57) This means that an average of 13 books were purchased each year between 2013 and 2020. Compared to the total amount of 1.3 million printed documents in SL funds (SAR p. 56) .But according new trends RTU use e-sources with different databases.

During our visit, experts were able to make sure that the spacious study rooms provided to the students are well-equipped with ergonomic work desks, interactive whiteboards and video projection systems. Students have at their disposal a computer class with the latest generation of stationary computers and large monitors. An excellent material and technical base with a wide range of well-equipped infrastructure (lighting, heat, ventilation) has been created for the implementation of the programme for laboratory work and practical work. The main machine tools are equipped with the necessary accessories and cutting tools. Students have access to a good base of hand tools.

The tuition fee student can choose to divide for the study year into two parts - one payment for each study semester, or to divide the fee for the study year into eight parts - payment four times a semester, which includes one payment for the first two months of the study semester and three payments, each in the amount of one month's tuition fee, for each month of the next study semester. (SAR p.230)

## **Conclusions by specifying the strengths and weaknesses**

The study base, scientific base, informative base, material, and technical base, and financial base comply with the specifics of the study program, implementation conditions, create preconditions for achieving study results, and indicate the possibility to ensure a quality study process. The study and science base, including the resources provided in the framework of cooperation with other scientific institutions and higher education institutions, meets the conditions for the implementation of creates preconditions for achieving study and research results and indicates the possibility to ensure quality study process.

### **Strengths:**

1. The financing of the study programme is guaranteed by the state of Latvia with an upward trend.
2. Excellent material and technical base.
3. Good industrially equipped workshops and laboratories.
4. Licensed software is available for students and academic staff.
5. The student can choose to divide the fee for the study year into several parts.

### **Weakness:**

1. The issue of centralized procurement of materials for laboratory practical work has not been resolved.

#### **4. Teaching Staff**

##### **Analysis**

46 members of the academic staff are involved in the implementation of the professional study programme "Material Technologies and Design" and it includes 29 members of the academic staff of the Institute of Design Technologies (further - IDT), 9 from the Department of Clothing and Textile Technologies (further - DCTT), and 17 members of the academic staff are from other structural units of RTU (SAR, p. 230). The total number of the academic staff of IDT employed in the study programme has increased from 26 to 29, however, the average age of the academic staff has decreased by 4 years, thus attesting to the generational change (SAR, p. 231-232). As the negative effects of generational change might poorly influence the quality of the studies, in experts' opinion the hiring of newer academic staff members and the overall average age of the academic staff members decreasing is an example of how the university undertakes measures effectively. Taking into account all of the previously mentioned, in experts' opinion, there are no visible risks in the structure of the teaching staff and the possible negative effects are targeted efficiently.

In the academic year 2020/2021, there was 1 professor, 5 associate professors, 3 assistant professors, 6 assistant professors (practical), 10 lecturers, 1 senior researcher, and 3 assistants. In comparison to the preceding period, the number of assistant professors (practical) has increased considerably (from 2 in 2013/2014 to 6 in 2020/2021), also the number of associate professors (from 3 to 5) and assistants has increased (from 0 to 3), however, the number of assistant professors and lecturers has decreased (from 6 to 3 and 12 to 10 respectively) (SAR, p.231). The composition of the academic staff has slightly changed in almost all the groups of the academic staff and this is related to the improvement of qualification. During the report period, five members of the academic staff got their Ph.D. degrees, therefore the experts can deduce that the increase in academic staff qualifications is something the university strives for. Based on the information provided in SAR from pages 232.-247., as well as Annex 6 (CV's of academic staff members), the experts are convinced that the qualifications of the teaching staff members comply with the requirements for this study programme and regulatory enactments.

The academic staff is actively involved in scientific research in the sub-branches "Wood materials and technologies" and "Textile and clothing technologies" of the field of Materials sciences, by performing research in the scientific directions of IDT (SAR, p. 247). The academic staff members are also involved in several international and national projects, such as INTERREG, European Social Fund, and Erasmus+ projects (SAR, p. 248). There is a visible contribution of the teaching staff in the research in the field of material technologies. The relevant publications and artistic work provided to experts are published in journals cited in Scopus or WoS. From the information available to the experts 313 out of 345 scientific publications are indexed in WoS and/or Scopus from the year 2013 until 2021, the average being 40 indexed publications per year within all of the academic staff members (SAR, Annex 8 "Publications\_patents"). Additionally, there are 55 publications in conference proceedings, which are also indexed by the WoS and/or Scopus (SAR, Annex 8 "Publications\_patents"). There are a couple of publications found in the aforementioned annex, which has 20-30, reaching up to even 70 citations in both - Scopus and WoS databases. As most (around 90% - SAR, Annex "Macibspeki\_Teaching staff") of the academic staff members involved in the implementation of this programme are also involved in the implementation for the other BSc programme, as well as MSc and Ph.D. programmes it is impossible to separate the involvement in scientific research specifically for teachers involved in the BSc programme "Material Technology and Design". An example was found with one academic staff member, who teaches Sociology and

Politology only for the two BSc programmes - 3 publications in local journals were found by the experts from the period of 2013 till 2021 (SAR, Annex 8 "Publications\_patents"). The number of the Scopus/WoS indexed publications is good, however, there are still 121 publications in the RTU scientific journal and RTU press (RTU conference proceedings) (SAR, Annex 8 "Publications\_patents"). The publication amount increase on an international level within journals with Scopus and/or WoS index would be beneficial for the university in the future. Ideally, the Scopus and/or WoS indexed publications should be double the amount published in the local journals and RTU press. Regarding the specifics of the study courses, it is mentioned in the SAR that academic staff members attend international, regional, and national seminars and exhibitions of the relevant field, such as A" Journey Beyond the Traditional Wooden Craft and Art" in 2016 "Woodcraft and Art" in 2017 with participants from more than 10 countries. Thus the academic staff members are getting acquainted with the current trends, gaining inspiration for the development of new concepts. Availability of a broad range of exhibitions both in Latvia and abroad allows regular upgrading of the study courses, by integrating the gained competencies to them (SAR, p. 253). As an example, a specific study course "Smart clothing" can be mentioned as it was created based on the competencies and research conclusions of academic staff members.

The progress of the interlinked study courses and the achieved learning outcomes are assessed and analyzed periodically. The analyses are made of students' surveys every semester within the RTU to help to carry out an objective assessment of the outcomes, considering students' opinions, assessments and recommendations. Based on the results the existing study courses are improved in compliance with the goals and objectives of the study programme and relevant study courses in the meetings of the DDMT. In the SAR it is mentioned that regular mutual communication among the academic staff members happens within joint meetings as well as individually. These meetings show the mechanisms of collaboration between the academic staff members involved in the implementation of this study programme and allow to assess the efficiency of mutual cooperation. Student performance indicators, for example, results of tests, practical assignments, laboratory assignments are discussed during the meetings so further improvements could be made if necessary (SAR, p. 253).

## **Conclusions by specifying the strengths and weaknesses**

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The involvement of the academic staff in research projects is at a satisfactory level, but the international Scopus/WoS involvement might be improved. The qualifications and research records of the academic staff members are on an adequate level. There are good collaboration mechanisms in place between the academic staff members.

### **Strengths:**

1. Increasing percentage of academic staff members, who possess Ph.D. degrees.
2. The academic staff members institute regular upgrades of the study courses by transferring their personal gained competencies to them.
3. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

### **Weaknesses:**

1. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.



## 5. Assessment of the Compliance of the Study Programme "Material Technology and Design"

### Requirements

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

**Assessment of compliance:** Fully compliant

The diploma sample provided in SAR (Annex 11

"Sample\_of\_the\_diploma\_and\_diploma\_supplement") fully complies with the procedure and regulations by which Latvian state-recognized documents of higher education are issued (Cabinet Regulations No 202).

The introductory paragraph in the Diploma Supplement provided in English should be reviewed and aligned with the Cabinet Regulations No 202, however as it is a purely technical discrepancy with a few words being different, in experts opinion, it does not affect the overall assessment of this criteria.

2. Documents confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued.

**Assessment of compliance:** Fully compliant

Full compliance can be found in the agreement with the Latvia University of Life Sciences and Technologies with professional bachelor study programme "Design and craft" (Annex "Vienosanašs\_LLU un RTU\_2020") it is valid for all - three specialties: 1) Textile design and technology 2) Clothing design and technology 3) Wooden products and interior design technologies.

3. Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme.

**Assessment of compliance:** Fully compliant

Full compliance can be found in RTU Rector's confirmation (SAR, Annex "On compensation of losses in case the study program is not accredited, or the license of the study program is revoked, and a student does not wish to continue studies in another study program", document No 01000-2.2.1-e/178)

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

**Assessment of compliance:** Fully compliant

The academic staff's official language knowledge fully complies with the Cabinet of Ministers Regulation No. 733 of 7 July 2009 "Regulations Regarding the Extent of the Knowledge of the Official Language, the Procedures for Examining the Proficiency in the Official Language and the State Fee for Examining the Proficiency in the Official Language" (SAR, RTU Vice-Rector's for Academic Affairs confirmation, annex "On the knowledge of the state language of the teaching

staff involved in the implementation of study programs corresponding to the study direction "Manufacture and Processing", document No 02000-2.2.1-e/95)

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully compliant with Cabinet regulations No 70 "Mandatory Provisions to be Included in the Study Agreement" (SAR, Annex "Sample of Study Agreements").

- 9 9. The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Institutions of Higher Education.

**Assessment of compliance:** Partially compliant

Study course descriptions are generally in compliance with the Law on Institutions of Higher Education Section 56.1, Paragraph two. They have been prepared in all languages in which the study programme is implemented. However, for some study course descriptions, for example, but not only, AAP714, ATM203, and MSM212 lack in the division of recommended literature between the obligatory and additional is observed.

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

**Assessment of compliance:** Fully compliant

Full compliance of the professional Bachelor's study programme "Material Technology and Design" with the currently valid professional standard for "Product Designer". Although it is technically compliant, in experts' opinion this professional standard is quite out of date and therefore the university could encourage the sectoral council to start working on a new professional standard for this qualification. When the new professional standard is approved, RTU needs to update the study programme in accordance with the new professional standard within six months after its publication on the website [www.visc.gov.lv](http://www.visc.gov.lv).

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully complies with the State Professional Higher Education Standard (Cabinet Regulations No 512). (SAR, Annex 6 "Compliance of the Study Programme Material Technology and Design").

- 13 13. The joint study programmes comply with the requirements prescribed in Section 551, Paragraphs one, two, and seven of the Law on Institutions of Higher Education (if applicable).

**Assessment of compliance:** Not relevant

- 14 14. Each member of the academic staff has either publications published in reviewed editions within the last six years, including international editions (if they have worked for a shorter period of time, the number of publications shall be in proportion to the work period), or artistic creation achievements (for instance, exhibitions, films, theatre performances, and concert activity), or a five-year practical work experience (except for the experience in the implementation of the study programme) in accordance with the Law on Institutions of Higher Education.

**Assessment of compliance:** Fully compliant

Justification can be found in SAR, Annex 8 (Annex\_8\_Publications\_Creative\_work).

- 15 R5 - Overall rating

**Assessment of compliance:** Partially compliant

The study programme mostly, but in one aspect still partially complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. See more in recommendations regarding this study programme.

## Requirements (R6-R8)

- 1 R6 - The compliance of the 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 ensuring the achievement of the learning outcomes.

**Assessment of compliance:** Fully compliant

The provision of the study programme is fully sufficient for the scientific support and informative provision for the implementation of the study programme and ensuring the achievement of the learning outcomes.

- 2 R7 - The compliance of the qualification of the academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments.

**Assessment of compliance:** Fully compliant

The qualifications of academic staff members involved in the implementation of this study programme are fully compliant with the conditions for this study programme as well as the respective regulatory enactments. For more detailed analysis please see chapter 4 of this study programme.

- 3 R8 - The study programme leading to the master or doctoral degree is based on the advances and findings in the relevant field of science or artistic creation.

**Assessment of compliance:** Not relevant**Conclusions by specifying the strengths and weaknesses**

The study programme prescribes the acquisition of both the corresponding professional Bachelor's degree and the professional qualification.

The content of the study programme is continuously renewed and improved according to the recent trends in the sector of light industry and wood industry, in the area of product design, the national economy, and regional development, considering the situation and requirements in the labor market, which could be further improved by addressing the necessary CAD PDS programs and knowledge of new materials and student responses in the surveys. Numerous diploma thesis reflects the goal of the study programme and envisaged results during the study process. The study implementation methods are diverse and chosen according to the study course content and specifics. The outcomes of the surveys conducted among the students and graduates are used to improve the quality of studies. It is not clear how and whether employers' comments in the questionnaires were considered to improve the study programme. The students use the opportunity to supplement their knowledge within the Erasmus program by both studying at foreign education institutions and doing their internships abroad. Namely, two to three students per year and even five students in 2017/2018 have been taking advantage of outgoing Erasmus mobility.

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The involvement of the academic staff in research projects is at a satisfactory level, but the international Scopus/Wos involvement might be improved. The qualifications and research records of the academic staff members are on an adequate level. There are good collaboration mechanisms in place between the academic staff members.

The provision with necessary resources of the study programme is appropriate for all 3 study specializations: 1) Textile design and technology. 2) Clothing design and technology 3) Wood products and interior design technologies.

According to the expert's observations, the available material base is sufficient to perform basic manipulations with the available materials for all study programme specialties.

**Strengths:**

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.
3. The content of the study programme is regularly updated and improved to cover the latest scientific trends and meet the needs of the relevant industry.
4. The study implementation methods are diverse and chosen according to the study course content and specifics.
5. The outcomes of the surveys conducted among students and graduates are used to improve the quality of the studies.
6. Study programme have highly motivated students with good basic knowledge and skills.
7. Increasing percentage of academic staff members, who possess Ph.D. degrees.

8. The academic staff members institute regular upgrades of the study courses by transferring their personal gained competencies to them
9. The financing of the study programme is guaranteed by the State of Latvia with an upward trend.
10. Excellent material and technical base.
11. Good industrially equipped workshops and laboratories.
12. Licensed software is available for students and academic staff.
13. The student can choose to divide the fee for the study year into several parts.
14. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

#### Weaknesses:

1. The programme SAR does not include information on the draft of the new professional standard.
3. Literature in some study courses is very extensive and requires an indication of the obligatory and additional literature.
4. For subjects from the fields of product design and development, garment patternmaking, information technology, graphics, furniture design, etc. the recent literature should be included in the curricula, and for some also in the RTU library.
5. The low number of survey responses by students.
6. It is not clear how and whether employers' comments in the questionnaire were considered to improve the study programme.
7. The issue of centralized procurement of materials for laboratory practical work has not been resolved.
8. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.
9. There are some technical discrepancies with the Cabinet Regulations No 202, in the diploma supplement provided to the experts.

### **Evaluation of the study programme "Material Technology and Design"**

Evaluation of the study programme:

Good

### **6. Recommendations for the Study Programme "Material Technology and Design"**

#### **Short-term recommendations**

- |  |
|--|
| 1. Agreements need to be reached with leading industry companies on the centralized supply of materials for laboratories and workshops in a one-year period.                         |
| 3. Until the hearing of the Study Quality Committee review of the study course descriptions is needed in order to separate recommended literature between obligatory and additional. |
| 4. Until the hearing of the Study Quality Committee the diploma supplement should be reviewed and aligned with the Cabinet regulations No 202.                                       |
| 5. During the 6 months period after the new professional standard publication RTU needs to make necessary changes and improvements in the content of the study programme.            |

#### **Long-term recommendations**

- |   |
|---|
| 1. Until the next accreditation, the number of publications in international Scopus/WoS indexed journals should be increased, ideally so it would double the publications in local/RTU press scientific journals. |
| 2. The share of external revenue needs to increase to relieve part of the basic budget until the next accreditation.  |
| 3. Updating curricula and library collection with recent literature.  |
| 4. The number of survey responses of students, graduates, and employers needs to be increased.  |

## II. "Design Engineering" ASSESSMENT

### II. "Design Engineering" ASSESSMENT

#### 1. Indicators Describing the Study Programme

##### Analysis

The name of the professional master's degree study programme "Design Engineering" (47548) corresponds to the evaluated study field "Manufacture and Processing". The aim of the study programme (To provide and develop students' professional, creative, and research competencies: in the field of textile and clothing design and production, by training specialists who ensure the company's order fulfilment, their execution process, and employee management, effective development, implementation, and management of new technologies, methodologies, and systems, as well as improvement and expanding the understanding of professional ethics and socially responsible management; to prepare specialists in the field of design for work in the field of indoor and outdoor product development in accordance with the ergonomic and technological solutions of their design usability, using appropriate raw materials (wood, metal, textiles, etc.), the respective processing technologies and their knowledge and skills of application of the implementation systems, is clearly defined and show both specialisations of this study programme: 1) Clothing and Textile Production Technologies; 2) Design specialization. The aim and the tasks of the study programme comply with the learning outcomes, as well as the admission requirements are appropriate. As the study program provides for specialization, the admission rules also provide for the possibility for students to be admitted with a different previous education. The content of studies is designed to ensure the achievement of the planned study results. Graduates receive a Professional master's degree in Design Engineering.

As graduates are awarded a Professional Master's Degree in Design Engineering, but a separate qualification is not awarded, the admission requirements (for studies in Latvian and in English) stipulate that admission is possible only with a Professional Bachelor's degree in Clothing and Textile Technology and Engineer production in Clothing and textile production or equivalent education or Professional Bachelor's degree in Materials Technology and Design and Product Designer qualification or equivalent education.

#### Conclusions by specifying the strengths and weaknesses

The parameters of the study programme are generally well-aligned.

##### Strengths:

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.

Weaknesses: N/A

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

### **Analysis**

The new professional master study programme “Design Engineering”, which is implemented since the study year 2020/2021, has a total number of 34 study courses (80 CP). It is implemented as full-time studies with a duration of two years and is available in two languages, Latvian and English. According to the SAR, the development of the study programme “Design Engineering” was based on the current events in the industry and surveys of industry operators as well as former and current master students. Significant emphasis was placed on the in-depth acquisition of theoretical knowledge in close connection with practical skills. As found in the SAR, the development of the study programme is based according to Cedefop (in Latvian [https://www.cedefop.europa.eu/files/9098\\_lv.pdf](https://www.cedefop.europa.eu/files/9098_lv.pdf)) forecast to the year 2025, where specific skills will be in demand in different occupational groups. In addition, in the SAR is stated to take into account the assessment of the economic sectors of the Riga region. Namely, the most promising production sectors are metal processing, wood processing, chemical industry, food and beverage production, as well as textile manufacturing (SAR). All criteria of the study programme are clearly defined and show both specialisations of this study programme: 1) Clothing and Textile Production Technologies; 2) Design specialization.

The study programme “Design Engineering” consists of Part A that has sixteen study courses, where there are six compulsory study courses for both specializations and five for the Clothing and Textile Technology specialization and five for the Design specialization. Part B contains fifteen limited choice study courses, where there are seven study courses for the Clothing and Textile Technology specialization, five for the Design specialization and three study projects. In addition, part C - free elective study courses contain five language block study courses. There is also an internship study course for each specialization of 6 CP and a master thesis study course for each specialization of 20 CP. The content of the study programme complies with the requirements of the standard with the Cabinet Regulations of the Republic of Latvia No. 512 (Annex 2). According to the SAR, the study process model group all study courses into five thematic study modules, to avoid overlapping of the topics that are included in the study courses (Design Research and Theory, Designing, Engineering and Creative Process Management, Project Management, Materials, Technologies & Production Management), which reflects a well-designed study programme. The professional master's degree in “Design Engineering” is awarded after mastering the theoretical and practical study courses of the study programme, internship in industry and defending the master's thesis in the presence of the State Examination Commission. Descriptions of study courses of the professional master study programme “Design Engineering” are attached in Annex 5. The connection of these study courses with the learning outcomes of the study programme is reflected in the mapping of the study courses (Annex 3).

Descriptions of study subjects are carefully and qualitatively prepared and include all the required information, i.e. basic information on the study course, the language of instruction, responsible instructor, teaching staff, goals and objectives of the course in terms of competencies and skills, structure and tasks of independent studies, recommended literature, course prerequisites and contents, learning outcomes and assessment, evaluation criteria of study results, course planning. All study courses provide a language of instruction in Latvian and English (except special study courses, such as Special German and Business German). The experts' group points out a few shortcomings. The study course title Design Marketing & Corporate Entrepreneurship (Annex 4) has in the curricula title Design Marketing (Annex 5). In the study course, Managerial Psychology is missing a description of the goals and objectives of the course in terms of competencies and skills. For some study courses, no literature is available in the RTU library for areas of sustainability of

textiles and clothing and sustainable product development, events planning. In addition, recent literature could be used in the areas of clothing design 2D and 3D technologies, user-centred design, business ethics, branding strategy. For study courses: Design & Technologies for Sustainability, Design and Technologies Project Management, Product Life Cycle and Quality System Management, Design for Change, Development of Technical Textiles the literature is not divided into the obligatory and additional literature.

In summary, the content of study courses is relevant and complimentary, and complies with the aims of the study programme, ensures the achievement of the learning outcomes, and meets the needs of the relevant industry and the scientific trends. Namely, common study courses provide knowledge about the problems of the 21st century, sustainability issues in design and technologies, design and technology project management and marketing, as well as scientific research methods, while the compulsory courses satisfying user requirements, change-oriented design, knowledge about product design and development, as well as related support tools - parametric 3D modelling and simulation.

The study implementation methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. The content of the professional master study programme "Design Engineering" consists of lectures, practical, laboratory and group work, as well as independent work that complies with the requirements of regulatory enactments, observing the RTU Senate decision "On uniform requirements for study programmes". The compliance of the study programme with the state educational standard comprises Annex 2. From the SAR it is evident that project-oriented education promotes students' motivation to acquire theoretical material in-depth and nuance because theoretical knowledge is to be used to ensure the quality of project development and it is end-user (student) oriented. The evaluation methods found in study courses (Annex 5 of the SAR) are diverse, such as theory tests, laboratory work, group work, work in pairs, interim presentations of the study project, final presentation of the study project, participation in group discussions and situation analyses, independent work etc. They are chosen by the academic staff responsible for the study course in accordance with the content of the study course and the specifics of the study programme, as well as the needs of students.

According to the SAR, the expert group can summarize how the study implementation methods, including the evaluation methods, contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. . The study programme has project-oriented studies based on the identification of challenges of design and technology in the 21st century, smart technologies, science and research, and socially responsible entrepreneurship; two large-scale study projects are developed during the studies based on the acquired knowledge in all study courses of the semester (Figure 1 in SAR). WThe study programme has project-oriented studies based on the identification of challenges of design and technology in the 21st century, smart technologies, science and research, and socially responsible entrepreneurship; two large-scale study projects are developed during the studies based on the acquired knowledge in all study courses of the semester (Figure 1 in SAR). Within the framework of the project, students have an opportunity to collaborate with entrepreneurs, moreover, during the studies, the continuation or start-up of students' businesses is offered to students. In addition, courses and seminars are regularly organized to improve pedagogical competencies of the academic staff on the latest pedagogical methods, which is appreciated and contributes to better learning outcomes of students.

According to the SAR, the objectives of the internship are related to the learning outcomes to be achieved and the accomplishment of the objectives is based on the building of collaboration, which is necessary for the development and promotion of new products/services and with the establishment of communication with various partners/structural units in the context of the institution and outside it. In addition, the internship for foreign students is the same as for Latvian students; foreign students can choose an internship place in Latvia, abroad, or their home country.



During the experts' visit, graduates of the professional Master's study programmes "Material Technology and Design" and "Clothing and Textile Technology" revealed that they received more knowledge than they expected, especially knowledge on technological processes that helps to develop products. Current students of the study programme "Design Engineering" (that is the continuation of previously mentioned programmes) have highlighted good distance lectures and want to continue listening to the theoretical part of the course at a distance, as many of them work while studying. Students want even more creative studies, as well as in-depth use of a CAD program for patternmaking and patternmaking of heavier clothing designs, as well as learning about advanced software over time. Both graduates and students exposed that they would like to have more excursions and that they are informed about fairs, whose visit depends on their ability to organize it themselves.

Data on the results of student surveys are in the SAR. They show that the average students' rate of the study courses implemented by IDT is 4.5 points (score scale from 1 to 5, where 5 is the highest score). Most of the study courses have been evaluated positively; however, no additional comments have been made.

In the SAR, there are also results of surveys of students, graduates and employers of the professional Master's study programmes "Material Technology and Design" and "Clothing and Textile Technology", whose comments and recommendations for improving the studies were taken into account in the design of the new professional Master's study programme "Design Engineering", such as an opportunity to choose study courses in both specializations has been provided; project-oriented studies have been introduced - they increase the proportion of practical work compared to the theoretical part and are related to the development of real products.

In the SAR, the information on the incoming and outgoing mobility for both studies and internship are provided for two previous professional master study programmes "Clothing and Textile Technology" and "Material Technology in the reporting period. As can be seen in the document "11\_attachment\_Statistics\_on\_Students\_Mobility.pdf" the total number of the outgoing mobility on the Erasmus+ studies were 17 students and on the Erasmus+ internship four students during the reported period. Based on this data experts conclude that students' outgoing mobility was good. During the reporting period, incoming mobility of Master's degree students does not occurred. One student of the professional master study programme "Design Engineering" is on an internship in Italy within Erasmus mobility in this study year 2021/2022. During the reporting period, no incoming mobility of master's degree students occurred, whilst they expect that foreign students will study in this new study programme in the future because the programme is also offered in English. The Erasmus partner universities can be found on the RTU Erasmus+ website [https://www.rtu.lv/en/internationalization/mobility/erasmus-plus/erasmus-outgoing-mobility/partners?NameEN=&CountryId=&scope=0723&coop\\_type=b&complete\\_match=1](https://www.rtu.lv/en/internationalization/mobility/erasmus-plus/erasmus-outgoing-mobility/partners?NameEN=&CountryId=&scope=0723&coop_type=b&complete_match=1).

RTU has established a stable and easily understandable system of recognition of the study courses acquired during the mobility. Before leaving, a student individually agrees with the director of the study programme on the list of the study courses at the foreign university to which the study courses planned in the given semester at the home university will be considered equivalent. If there are any changes during the mobility, they are agreed by electronic means. Upon returning from the exchange programme, the study courses acquired at the foreign university are recognized for a student, provided that a positive assessment has been obtained, which is confirmed in the documents issued by the university. All documentation and the procedure related to the Erasmus studies are provided by the RTU International Cooperation and Foreign Students Department (<https://www.rtu.lv/en/internationalization>). Recognition of study courses completed during the mobility is done based on the order of the RTU Study Vice-Rector of 29 October 2014 No. 01000-1.1/240 "On amendments in the procedure of organisation of Erasmus+ student mobility" and order of 4 April 2016 No. 02000-1.1/29 "On the procedure of recognition of study courses completed at other higher education institutions and study programs".

## Conclusions by specifying the strengths and weaknesses

The descriptions of the study courses reveal that the professional master study programme "Design Engineering" is a well-designed programme that provides in-depth theoretical knowledge in close connection with practical skills. The study implementation methods are diverse and in focus of a project oriented study, and meet the needs of the relevant industry and the scientific trends based on the identification of challenges of design and technology in the 21st century, smart technologies, science and research, and socially responsible entrepreneurship; in focus is a project-oriented study based on the identification of challenges of design and technology in the 21st century, smart technologies, science and research, and socially responsible entrepreneurship. The results of surveys of students, graduates and employers of the old professional Master's study programmes "Material Technology and Design" and "Clothing and Textile Technology" were taken into account in the design of the new professional Master's study programme "Design Engineering" to provide study courses for both specializations Clothing and Textile Production Technologies and Design and implemented in both Latvian and English language. The project-oriented studies have been introduced to increase the proportion of practical work compared to the theoretical part and are related to the development of real products. The students' outgoing mobility was good in the reported period, while incoming mobility of Master's degree students did not occur. Within the new study programme, an increase in foreign students is expected.

### Strengths:

1. The content of the new study programme is well-designed, the aims and learning outcomes are interrelated and well-focused.
2. The curriculum development took into consideration research results on needed competencies in the industry and results of surveys of students, graduates, and employers.

### Weaknesses:

1. Literature in some study courses is very extensive and requires an indication of the obligatory and additional literature.
2. For some study courses, the list of literature does not include recent books and journals.

## 3. Resources and Provision of the Study Programme

### Analysis

The professional master's study programme "Design Engineering" is a modern study programme that is open to cooperation and interdisciplinary. The study programme is implemented at Ķīpsalas Street 6, the total area of the building is 10462.78 m<sup>2</sup> with four above-ground floors, of which 6602.90 m<sup>2</sup> is occupied by IDT. (SAR p.283-286). Lectures take place in five auditoriums that are fully equipped with multimedia equipment and in two RTU-shared auditoriums.

Students carry out their activities in:

Two specially equipped IT laboratories (SAR p.220) are used for the needs of the study programme:

- CAD / CAM laboratory for clothing and textile design (53.5 m<sup>2</sup>)
- Modeling and design laboratory (79.7 m<sup>2</sup>)

IT laboratories together with 37 (16 + 20 + 1) computers are equipped with workstations and are provided with general-purpose 2D and 3D design, calculation and image processing systems, and licensed application software.

Practical training is carried out in six specialized workshops: (SAR p.221-222)

- Wood technology and assembly workshop (375.4 m<sup>2</sup>)
- Sewing workshop (88.9 m<sup>2</sup>)
- Fashion Design Workshop (156.8 m<sup>2</sup>)

- Batik workshop (11 m2)
- Weaving workshop (54.4 m2)
- Knitwear workshop (59.4 m2)

Research laboratory work is carried out in three specialized laboratories:  
(SAR p.223-227)

- Knitwear and textile laboratory (73.6 m2)
- Materials, Technology and Design Laboratory (57.8 m2)
- Timber Research Laboratory (29.4 m2)

Scientific and technical laboratory works are carried out in twelve specialized laboratories:

- Woodworking laboratory working with hand tools (39.7 m2 and 16 m2)
- Layout and woodworking laboratory (17.9 m2)
- Sewing Machine Mechanics and Embroidery Laboratory (46.8 m2)
- Materials Science Laboratory (59.1 m2 and 77.1 m2)
- Anthropometry Laboratory (51.8 m2)
- Measurement laboratory ESM (16.7 m2, 38.4 m2)
- Measurement laboratory (21.6 m2)
- Textile Research Laboratory (30.2 m2)
- Timber Research Laboratory (27 m2)

Students have access to the entire IDT infrastructure and can use any facilities and equipment as needed. The technical equipment of laboratories and workshops needs to be improved to the CNC machinery level to meet the new requirements of today's industry (both woodworking and textiles). At present, laboratories and workshops have the equipment, instruments, and measuring devices that can perform a full basic cycle of wood and textile processing. They now operate as independent woodworking and textile processing divisions. According to the experts' opinion, the ability to combine the visions of these separate divisions could provide a good basis for the development of upholstered furniture design and modeling.

Students and lecturers use the opportunities and resources provided by RTU, such as the RTU Scientific Library (SL) (<https://www.rtu.lv/en/studies/scientificlibrary>). That is a library of national importance, which has acquired its status in the process of library accreditation. The SL provides the necessary information to ensure RTU study process and research activities, as well as provides a library, bibliographic, and information services to RTU students, academic and general staff. The Library holds more than 1.3 million printed documents and e-resources in RTU industry-specific databases. The Library stock is located at the Central Library, the Study Material Subscription, the Chemistry Branch, the Transport Branch, and Study and Research Centres in Daugavpils, Liepāja, Cēsis, and Ventspils (SAR p.57)

There is a unified portal ORTUS, IT services, the Study Management System, the Science Support System. By using ORTUS, students and academic staff have access to extensive information resources, including electronic library resources which are continuously updated. Within the RTU ORTUS environment, students have access to international databases: Web of Science, EBSCO, SCOPUS, Science Direct, SpringerLink journals and books with full text, and other information resources. Specialized necessary literature sources are provided by the relevant profile structural unit which procures annual subscriptions within the unified procurement of the RTU library (SAR p.168).

IDT funding has been stable over the last three years and is on the rise. The increase in funding compared to the previous year (2018/2019) is 9.47%. (SAR p. 46). Funding for the study programme "Material Design and Technologies" has been generally higher, which is related to the number of students in the study programme. At this moment financial provision of the programs are sufficient because both study programmes implemented in the reporting period were financed from the state budget; none of the students paid tuition fee.

Cost per student in the two study programmes was equal with a tendency to increase beginning

from the academic year 2017/2018. (SAR p.280).

There is a lack of special literature, in Latvian language for the studies and also in English. At the request of the academic staff of the specialization field "Clothing and Textile Technology", 42 new books were purchased by the SL amounting to 3956.42 EUR in the period of 2013 - 2020. At the request of the academic staff of the specialization field "Material technology and Design", 49 new books were purchased by the SL amounting to 2975.86 EUR in the period of 2013 - 2020. (SAR p.57) This means that an average of 13 books were purchased each year between 2013 and 2020. Compared to the total amount of 1.3 million printed documents in SL funds (SAR p. 56).

The experts opinion is that real design results can be achieved by meeting and interacting with two or more different disciplines or materials. In this case, it is wood and textile. And experts strongest conviction is that this programme can achieve really well-known results internationally if they will find the ways to interaction .

Other RTU structural units are also involved in the implementation of the study programme "Design Engineering", such as the FMSAC, the Institute of Technical Physics , the Faculty of Engineering Economics and Management , the Institute of Business Engineering and Management , the Institute of Applied Linguistics of the Faculty of E-Learning Technologies and Humanities and the Riga Business School . IDT has already been operating in the field of smart specializations for several years implementing

a number of scientific projects, which has resulted in the development of the knowledge base.

Consequently, several study courses related to smart materials and technologies are implemented within the professional Master's study programme "Design Engineering". For example one of them – "Physics

and Electronics of Smart Materials" (RTU code: KFM705) – is provided by ITP, making use of the study base at the disposal of ITP, i.e., the academic staff and laboratories. (SAR p.282)

## **Conclusions by specifying the strengths and weaknesses**

The study base, scientific base, informative base, material, and technical base, and financial base comply with the specifics of the study program, implementation conditions, create preconditions for achieving study results, and indicate the possibility to ensure a quality study process in the future. The study and science base, including the resources provided within the framework of cooperation with other scientific institutions and higher education institutions, meets the conditions for the implementation of the doctoral study program, creates preconditions for achieving study and research results, and indicates the possibility to ensure a quality study process.

Strengths:

1. The opportunities and set of resources provided by RTU allow the study programme to develop as a modern study programme that is open and interdisciplinary.

Weaknesses:

1. The technical equipment of laboratories and workshops needs to be improved to meet the new requirements of today's industry (both woodworking and textiles).

## **4. Teaching Staff**

### **Analysis**

In total, 33 academic staff members are involved in the implementation of this study programme. The implementation of this study programme started only in the academic year 2020/2021, thus so far, there have been no changes in the academic staff member composition (SAR, p. 287). However,

taking into account all of the before mentioned and evaluation of this criterion for the relevant professional BSc programmes experts see no threat that the changes in the composition of academic staff members could poorly influence the study quality and see that RTU undertakes target-oriented measures to avoid the lack of qualitative generational change.

Most of the academic staff members (70%) responsible for the study courses in this study programme hold a doctoral degree, as well as 8 of them, are experts of the Latvian Council of Science in the field of material science (SAR, p. 288). Choosing the academic staff members is related to their specific education, scientific and practical work experience, taking into account the specifics of the study programme and courses. A practicing designer with more than ten years of experience in the field is also involved in the implementation of the study programme (SAR, p.287). Based on the information provided in SAR from pages 288.-298., as well as Annex 6 (CV's of academic staff members), the experts are convinced that the qualifications of the teaching staff members comply with the requirements for this study programme and regulatory enactments. For the academic staff members who implement their courses in English, the language level is adequate (Annex "Macibspeki\_Teaching\_staff"). Experts were mostly assured of the quality of English level during the onsite visit - the overall level of spoken English was mostly good, however, some of the academic staff members could benefit from improving their spoken English, even though the level mentioned in the Annexes was C1.

The academic staff is actively involved in scientific research. The academic staff members are involved in several international and national projects, such as FLPP (in Latvian - Fundamentālo un lietišķo pētījumu projekti (transl. - Fundamental and applied research projects)), INTERREG, European Social Fund and Erasmus+ projects (SAR, p. 299). The results of INTERREG, European Union Structural Funds Objective 3 of "European Territorial Cooperation" programme international research project No. R006 "Smart and Safe Work Wear Clothing" were integrated into the study courses "Development of Smart Products", "Technological Systems and Supply Chains Management and Logistic, "Product Life Cycle and Quality Management", "Clothing Design 2D and 3D Technologies" (SAR, p.300). There is a visible contribution of the teaching staff in the research in the field of design and technologies. The experience gained is integrated into the study process both by supplementing lecture materials, using new methods in research, and discussing the experience with students. As mentioned in the SAR, most often, new findings are integrated into the Master's theses. As the academic staff members participate in projects as researchers and as well as project leaders and managers, the experience gained in project implementation and management skills are integrated into the study course "Design and Technology Project Management" (SAR, p.300). The relevant publications and artistic work provided to experts are published in journals cited in Scopus or WoS (SAR, Annex\_8\_Publications\_Creative\_work). From the information available to the experts 313 out of 345 scientific publications are indexed in WoS and/or Scopus from the year 2013 until 2021, the average being 40 indexed publications per year within all of the academic staff members (SAR, Annex 8 "Publications\_patents"). Additionally, there are 55 publications in conference proceedings, which are also indexed by the WoS and/or Scopus (SAR, Annex 8 "Publications\_patents"). There are a couple of publications found in the aforementioned annex, which has 20-30, reaching up to even 70 citations in both - Scopus and WoS databases. As most (around 90% - SAR, Annex "Macibspeki\_Teaching staff") of the academic staff members involved in the implementation of this programme are also involved in the implementation for the other two BSc programmes, as well as the Ph.D. programme it is impossible to separate the involvement in scientific research specifically for teachers involved in the MSc programme "Design Engineering". The number of the Scopus/WoS indexed publications is good, however, there are still 121 publications in the RTU scientific journal and RTU press (RTU conference proceedings) (SAR, Annex 8 "Publications\_patents"). The publication amount increase on an international level within journals with Scopus and/or WoS index would be beneficial for the university in the future. Ideally, the Scopus and/or WoS indexed publications should be double the amount published in the local journals and

RTU press.

The study programme is implemented by the academic staff of IDT, however, the academic staff of other structural units of RTU is also involved in the implementation of this study programme. Riga Business School (RBS) is responsible for teaching the course "Business Ethics", Faculty of Engineering and Business Management – for the course "Management Psychology" and "Topical Issues in Marketing and Strategic Management", Faculty of E-Learning Technologies and Humanities – for specialized English, German and Latvian language courses. Also, industry experts are invited as visiting lecturers for the implementation of the courses (SAR, p.287). The professional Master's study programme "Design Engineering" is based on project-oriented education, which envisages the development of a study project every semester. The study project is implemented in collaboration with the academic staff of all study courses involved in the respective semester. Each part of the study project is related to a certain study course. To advance the project, several meetings between students and lecturers are organized every semester to discuss both the implementation of the study project and the study process in general, thus ensuring collaboration between both lecturers and students, targeted at a common goal. During the meetings there is a discussion about the progress and quality of the work, proposals are made for the desired changes in the study programme or individual study courses. All of the aforementioned gives experts an opinion that the collaboration mechanisms between the different faculties and their respective staff members are in place and strong. It is strengthened by the fact that the study programme "Design Engineering" is based on project-oriented education, which envisages the development of a study project every semester. The study project is implemented in collaboration with the academic staff of all study courses involved in the respective semester (SAR, p. 301).

### **Conclusions by specifying the strengths and weaknesses**

The qualifications and research records of the academic staff members are on an adequate level. In some cases, the spoken English language level might be improved for the teachers implementing their courses in English. The involvement of the academic staff in research projects is at a satisfactory level, but the international involvement might be improved. There are good collaboration mechanisms in place between the academic staff members within the implementation of the study programme.

Strengths:

1. Strong collaboration between the academic staff members of all involved faculties.
2. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

Weaknesses:

1. Some discrepancies of the provided level of English language levels for some academic staff members with the spoken English level heard during the onsite visit.
2. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.

## **5. Assessment of the Compliance of the Study Programme "Design Engineering"**

### **Requirements**

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

**Assessment of compliance:** Fully compliant

The sample of the diploma to be issued for the acquisition of the study programme complies with the procedure by which state-recognized documents of higher education are issued (Sample of diploma provided in Annex of SAR).

- 2 2. Documents confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued.

**Assessment of compliance:** Partially compliant

RTU has concluded an agreement with the University of Life Sciences and Technology of Latvia (LLU) that the student will be able to continue studies in the academic master study programme "Wood materials and technology". However, it should be taken into account that LLU offers this study programme only in Latvian (information from LLU website 22.12.2021.

<https://www.llu.lv/en/master-study-programmes>), which means that for RTU foreign students there wouldn't be an opportunity to continue studies in this programme, also students specializing in Clothing and Textile Production Technologies will not be able to continue their studies in the study programme of LLU. Also LLU study programme is academic, but RTU - professional.

- 3 3. Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme.

**Assessment of compliance:** Fully compliant

Confirmation of losses compensation is available in the annex (Par\_zaudējumu\_kompensāciju.edoc).

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

**Assessment of compliance:** Fully compliant

CV of the teaching staff provides the proficiency of the official language.

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

**Assessment of compliance:** Fully compliant

Full compliance can be found in RTU Vice-Rector's for Academic Affairs confirmation and also in the annex "academic staff CV" and annex "Macibspeki\_Teaching\_staff.xlsx".

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully compliant with Cabinet regulations No 70 “Mandatory Provisions to be Included in the Study Agreement”. Study agreement in both languages is provided in annex “Sample\_of\_study\_agreements”

- 9 9. The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Institutions of Higher Education.

**Assessment of compliance:** Partially compliant

Approved by investigating Annexes containing Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme, Curriculum of the study programme, and Descriptions of the study courses/ modules. Literature in some study courses is very extensive and requires an indication of the obligatory and additional literature. For some study courses, the list of literature does not include recent books and journals. The RTU library should be updated to include the newest literature.

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

Fully complies with the State Professional Higher Education Standard (Cabinet Regulations No 512). (SAR, Annex 6 “Compliance of the Study Programme with the State Education Standard”).

- 13 13. The joint study programmes comply with the requirements prescribed in Section 551, Paragraphs one, two, and seven of the Law on Institutions of Higher Education (if applicable).

**Assessment of compliance:** Not relevant



- 14 14. Each member of the academic staff has either publications published in reviewed editions within the last six years, including international editions (if they have worked for a shorter period of time, the number of publications shall be in proportion to the work period), or artistic creation achievements (for instance, exhibitions, films, theatre performances, and concert activity), or a five-year practical work experience (except for the experience in the implementation of the study programme) in accordance with the Law on Institutions of Higher Education.

**Assessment of compliance:** Fully compliant

Approved by investigating SAR, CV, and annex “Publications of the teaching staff in the field of materials science of the study field “Production and processing”. Comply for all academic staff except Larisa Rozenberga.

- 15 R5 - Overall rating

**Assessment of compliance:** Partially compliant

The study programme mostly, but in the two aspects still partially complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. See more in recommendations regarding this study programme.

### **Requirements (R6-R8)**

- 1 R6 - The compliance of the 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 ensuring the achievement of the learning outcomes.

**Assessment of compliance:** Fully compliant

The provision of the study programme is fully sufficient for the scientific support and informative provision for the implementation of the study programme and ensuring the achievement of the learning outcomes.

- 2 R7 - The compliance of the qualification of the academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments.

**Assessment of compliance:** Fully compliant

The qualifications of academic staff members involved in the implementation of the study programme are fully compliant with the conditions for this study programme as well as the respective regulatory enactments. For more detailed analysis please see chapter 4 of this study programme.

- 3 R8 - The study programme leading to the master or doctoral degree is based on the advances and findings in the relevant field of science or artistic creation.

**Assessment of compliance:** Fully compliant

The involvement of the academic staff in research projects is at a satisfactory level. For more detailed analysis please see chapter 4 of this study programme.

### **Conclusions by specifying the strengths and weaknesses**

The parameters of the study programme are generally well-aligned.

The descriptions of the study courses reveal that the professional master study programme “Design Engineering” is a well-designed programme that provides in-depth theoretical knowledge in close

connection with practical skills. The study implementation methods are diverse; in focus is project-oriented studies based on the identification of challenges of design and technology in the 21st century, smart technologies, science and research, and socially responsible entrepreneurship. The results of surveys of students, graduates and employers of the old professional Master's study programmes "Material Technology and Design" and "Clothing and Textile Technology" were taken into account in the design of the new professional Master's study programme "Design Engineering" to provide study courses for both specializations Clothing and Textile Production Technologies and Design and implemented in both Latvian and English language. The project-oriented studies have been introduced to increase the proportion of practical work compared to the theoretical part and are related to the development of real products. The students' outgoing mobility was good in the reported period, while incoming mobility of Master's degree students did not occur. Within the new study programme, an increase in foreign students is expected.

An appropriate study base and provision for the new study programme to achieve the study outcomes has been created. That allows IDT to fully provide teaching and methodological work, supervision and defence of final theses, as well as activities related to scientific work.

The qualifications and research records of the academic staff members are on an adequate level. In some cases, the spoken English language level might be improved for the teachers implementing their courses in English. The involvement of the academic staff in research projects is at a satisfactory level, but the international involvement might be improved. There are good collaboration mechanisms in place between the academic staff members within the implementation of the study programme.

#### Strengths:

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.
3. The content of the new study programme is well-designed, the aims and learning outcomes are interrelated and well-focused.
4. The curriculum development took into consideration research results on needed competencies in the industry and results of surveys of students, graduates, and employers.
5. Strong collaboration between the academic staff members of all involved faculties
6. The opportunities and set of resources provided by RTU allow the study programme to develop as a modern study programme that is open and interdisciplinary.
7. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

#### Weaknesses:

1. Literature in some study courses is very extensive and requires an indication of the obligatory and additional literature.
2. For some study courses, the list of literature does not include recent books and journals.
3. Some discrepancies of the provided level of English language levels for some academic staff members with the spoken English level heard during the onsite visit.
4. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.
5. There is no agreement with the university, which in case RTU stops implementing the study programme, would be ready to take over foreign students or students who have specializing in Clothing and Textile Production Technologies. Also LLU study programme is academic, but RTU - professional.
6. The technical equipment of laboratories and workshops needs to be improved to meet the new requirements of today's industry (both woodworking and textiles).

## Evaluation of the study programme "Design Engineering"

Evaluation of the study programme:

Good

## 6. Recommendations for the Study Programme "Design Engineering"

### Short-term recommendations

1. Within two years, sign an agreement with another university, which, in case RTU terminates the study programme, would be ready to take over foreign students or students who have chosen the specialization of Clothing and Textile Production Technologies.
2. Until the hearing of the Study Quality Committee review of the study course descriptions is needed in order to separate recommended literature between obligatory and additional.

### Long-term recommendations

1. The share of external revenue needs to be increased to relieve part of the basic budget and RTU must avoid a budget deficit, in four years.
2. The technical equipment of laboratories and workshops needs to be improved to meet the new requirements of today's industry (both woodworking and textiles), in four years.
3. Until the next accreditation, update curricula and library collection with recent literature.
4. Until the next accreditation, the number of publications in international Scopus/WoS indexed journals should be increased, ideally so it would double the publications in local/RTU press scientific journals.
5. Some academic staff members should improve their English levels until the next accreditation.

## II. "Fibre Materials Science" ASSESSMENT

### II. "Fibre Materials Science" ASSESSMENT

#### 1. Indicators Describing the Study Programme

##### Analysis

The name of the doctoral study programme, the degree to be acquired, the aims, objectives, learning outcomes as well as admission requirements are interrelated. The goal of the study programme is "promotion of the development of the textile and clothing technology sub-field, wood materials and product technology sub-field of the materials science field and related fields of the national economy in the region by training top qualification professionals of international level for independent scientific work in research, design, and development of innovative and traditional fiber materials and their products and introduction of relevant technologies, as well as academic work in higher education institutions for the regular renovation of the teaching staff, thus ensuring the generation cycle in the materials science field as a whole." (SAR, p.146). The tasks defined and the results of the study programme support the achievement of the goal. 8 learning outcomes are defined, and the mapping is carried out to compare the content of the study programme with the learning outcomes (SAR, annex Mapping of the Doctoral Program "Fibre Materials Science (Clothing and Textile Technology)"). The admission requirements are defined - the applicants need to have a

master's degree in Engineering or comparable education and additionally for foreign students assessment of the level of English language skills in accordance with the requirements specified in regulatory enactments. A doctoral thesis proposal is compulsory for applicants, and they have to pass an interview. To complete the study programme, the doctoral degree candidates defend their doctoral thesis or a comparable set of scientific publications on the same topic at the promotion council. Previous education (proof of English language skills for foreign students) and an interview on the planned topic of the dissertation is sufficient to objectively evaluate a potential doctoral student.

The graduates of the study programme are awarded a Doctor of Science (Ph.D.) in materials science. RTU plans to start to implement this study programme in English (it was added during this assessment procedure).

### **Conclusions by specifying the strengths and weaknesses**

The name of the programme, the goal, the results, admission criteria, and the requirements for graduating from the programme are aligned.

Strengths:

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.

Weaknesses: N/A

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

### **Analysis**

The doctoral study programme "Fibre Materials Science" is implemented by the Institute of Design Technologies (IDT) of the Faculty of Material Science and Applied Chemistry RTU. As can be seen in the SAR its implementation is based on the laws and regulations of the Republic of Latvia, RTU internal regulations, and the principles of the Ph.D. education recommended by EUA (European University Association).

The doctoral study programme provides promotion of the development of clothing, textiles, wood, and other fiber materials products and technologies, science fields, and related economic industries in the region, and it is unique in Latvia as is the only one in the country that provides advanced academic studies of the design of fiber materials, in particular, textile, wood, and other fiber materials. The compliance of the Doctoral study programme "Fibre Materials Science" with requirements of the "The Law on Higher Education Institutions" is given in Annex 2.

Study courses are developed to ensure that they mutually and sequentially supplement each other and direct the study process towards the full-scope acquisition of the study programme and attaining the envisaged results. In the Annex No. 3, the link between study courses and the learning outcome of the study programme is reflected by the mapping of the attainable results of study courses, that consist of Part A: compulsory study courses of 15 CP (3 study courses), Part B: Compulsory elective study courses of 21 CP (19 study courses), Part C: free elective study courses of 6 CP and Part E: Final exam of 150 CP. The plan of the doctoral study programme "Fibre Materials Science" is given in Annex 4, whilst the description of the study courses is in Annex 5.

The descriptions of the study courses reflect good quality and include all the required information, i.e. basic information on the study course, the language of instruction, responsible instructor, teaching staff, goals, and objectives of the course in terms of competencies and skills, structure and tasks of independent studies, recommended literature, course prerequisites, and contents, learning outcomes and assessment, evaluation criteria of study results, course planning. During the review of

the plan of the doctoral study programme and description of the study courses (Annexes 4 and 5), it was concluded that the information contained in the study courses form a logical mutual link, ensuring the growth of the knowledge and skills of students. The study programme comprises several study courses, for example, "Fibre Materials Science", "Design Thinking in Engineering Sciences", "Development and Research of Smart Textiles", "Specialized Bio- and Nanotechnologies"; "Functional and Smart Clothing Development and Research"; "Conceptual Models of Fibre Materials and Product Design", "Wood Processing Technologies and Creative Design", "Conceptual Models of Fibre Materials and Product Design", which is in line with aims of the study programme. This allows students to successfully perform the research work according to priorities in the related industries of the national economy on the national and European scale and meet the needs of the relevant industry and scientific trends. In the SAR report is stated that the topicality of the study programme has been increasing rapidly during recent years, and RTU IDT feels it by receiving regular inquiries from Latvian undertakings, NGOs for new innovative, science intense solutions on clothing, textile, wood, and other fiber material and product design, the solution of which, by satisfying the growing public needs, is also important for securing the environmental sustainability. The fiber materials and their products also rank fourth as regards the use of primary raw materials and water and fifth as regards emission of greenhouse gas emissions globally (Brussels, 11.3.2020, COM(2020) 98 final, A new Circular Economy Action Plan (europa.eu)), therefore the promotion of the market of circulation of sustainable fiber materials and their products is among the EU strategic goals. In addition, according to the SAR, study courses include topics related to the implementation of the national scale research and innovation strategies for the transformation of the national economy "Smart Specialisation Strategy (RIS3)" in research. There are two compulsory elective study courses "Special Course on Research Direction (MVR772)" and "Special Course of the Research Direction (MVR763)" with the same content, and both are conducted in the 7th semester, which can at first glance confuses the choice of subject. One subject is intended for the field of wood materials and technologies, and the other is for the field of textile and clothing technologies. Perhaps it would be better to give both areas already in the subject title. The study literature in some subjects needs to be updated with newer ones and/or should be included in the RTU library, if it is not within e-sources (e.g. for subject Clothing Comfort, Fiber Materials Science, Design Thinking in Engineering Science, Functional and smart clothing development and research, Advanced Textile Technologies, Development and Research of Smart Textiles, Textile material Research, Advanced Weaving Technology, Research in Knitting Processes, Research of Fabrics Modified by Multi-Systems Yarns, Research in Clothing Assortment and Quality).

Scientific work of students is performed under the supervision of a scientific supervisor. According to the SAR, scientific supervisors of doctoral students' thesis ensure that the research topics conform with the national and EU research interests, which is attested by the participation of many Ph.D. students in the implementation of various international projects (ESF, Interreg, Erasmus+). The doctoral theses are developed and defended in priority science directions as defined by the state of Latvia (Cabinet Ordinance No.776, 13.12.2017), like "Research and sustainable use of domestic natural resources for the development of the knowledge-based bioeconomy" and "Technologies, materials and engineering systems for increasing the value-added of products and processes". In the interview of the expert group with the doctoral students, they pointed out the satisfaction and strong support of the academic staff in their scientific research work and guidance until the completion of the doctoral thesis. As well as, they are satisfied with their training for new lecturers of study courses. From the statements of the students, it was possible to conclude that they want themselves to choose subjects from elective courses, which means they have mostly no influence on this. Students have no restrictions (enough resources) on publishing the necessary scientific research articles and participating in international conferences to present annual reports that provide the possibilities of knowledge and experience transfer. This is also reflected in the results of the doctoral student survey (in the appendix Studejoso\_aptauja\_Survey\_of\_Students.pdf ). The

expert group can point out that doctoral students are very motivated and satisfied with their studies. The SAR shows that various forms of implementation of the content of study courses are envisaged for the implementation of the study programme since the academic staff works with students in small groups and most of the work is performed individually. The teaching methods for implementation of study courses, as well as the assessment methods, are selected by the academic staff responsible for the study course in compliance with the specifics of the content of the study course and students' needs. The study process encourages a doctoral student to be independent, at the same time providing guidance and support by the academic staff as a scientific supervisor and a mentor. At the beginning of the studies, a doctoral student prepares the work plan for the first study year and the plan (schedule) of development of the doctorate thesis research for the whole Ph.D. study period approved by the scientific supervisor of the Ph.D. thesis and submits it to RTU Ph.D. Studies Department. The plan comprises sections, like the title of the research work, substantiation, topicality of the theme, as well as the scientific novelty and practical application. It contains the study courses to be completed, the stages of the science work, preparation of publications, participation in conferences, as well as the teaching work and improvement of qualification (seminars, conferences, symposiums, internship). Doctoral student harmonizes the work plan for every next study year with the scientific supervisors and submit it to RTU Ph.D. Studies Department. A Ph.D. student may change the scientific supervisor, as well as involve a co-supervisor and a consultant by submitting a substantiated application during studies. The SAR report states that RTU promotes the principles of a student-centered education with the timely preparation of the plan, encouraging the student's independence, and at the same time providing support by the scientific supervisor and academic staff. During the experts' visit, no comments from students on the set way of working were found.

According to the SAR, assessment of study results is done in compliance with Senate of RTU decision of 29 May 2017 (Minutes No. 610) "Regulation on the Assessment of Learning Outcomes", which conforms to the core principles and procedure of assessment of education on the relevant education level defined by the Cabinet Regulations of the Republic of Latvia. The cumulative assessment approach is applied in assessing students' achievement where the final grade consists of several components.

The annual monitoring of the knowledge and achievements of doctoral students and the encouragement and assistance of students to progress and transition to the next study year is assessed by the expert group as a good way to ensure excellent learning outcomes for students.

The final examination of the Ph.D. study programme is the defense of the Ph.D. thesis or a comparable set of scientific publications on the same topic at the Promotion Council.

The topics of the doctoral dissertations support six research directions of the IDT and are listed in Section 2.2 (page 156 of the SAR), which are relevant in the industries of the national economy and for the development of materials science and are fairly well distributed across research areas (listed topics of the doctoral thesis on pages 160 - 163 of the SAR). During the visit to the faculty, the expert group noticed that most of the doctoral dissertations are not developed for the needs of industry, but the results will be implemented in the industrial environment after the research is completed. Therefore, experts suggest that most topics of doctoral theses would be chosen in cooperation with industry and for the needs of it.

The results of surveys of students and graduates are used for improving the quality of the study programme (annexes Studejoso\_aptauja\_Survey\_of\_Students.pdf and absolventu\_aptauju\_rezultate\_Alumni\_survey\_results.pdf). The SAR report indicates that academic staff estimate that the overall activity of respondents in surveys is low. It is not clear from the students' survey how many of them completed the survey in the assessment period, as the results are given only in percentages. The survey was completed by eight graduates in 2013-2019; in 2016-2018, no respondents completed the survey. The results of employers' surveys were not observed in the SAR report and the annexes. In the survey, the doctoral students gave various

evaluations of their progress in the acquisition of the study programme and development of the doctorate thesis, publication activity, which differs from individual to individual according to their life priorities. The survey results regarding the Ph.D. students' satisfaction with the scientific advisor of the scientific research work indicate that the respondents are mostly satisfied with the cooperation with their scientific advisor and the provided support.

As can be seen from the graduates' survey regarding the organization of the doctoral studies, it can be concluded that almost all the graduates have appreciated the cooperation with the RTU Doctoral Studies Department, the faculty secretariat, and their scientific advisor of the Ph.D. thesis. According to graduates' recommendations, the distribution of the study load was carried out by modifying the schedules of study semesters and the study course "Methodology of Research" was supplemented by a section of the study course where it is possible to master modern research equipment and methods. They also highlighted the problem regarding the availability of sector publications, because most recent publications are available only for an extra charge. To provide access to sector standard documents, the subscription to the database of the national standards of Latvia was provided in the IDT premises.

It can be concluded that outcomes of the surveys conducted among students and graduates are used to improve the quality of studies, but the overall activity in surveys is low.

The self-evaluation report shows awareness that the study process and its efficiency are considerably affected by the possibility provided to students to supplement their knowledge at foreign higher education institutions, which allows students to expand the scope of their knowledge and competence, improving their communication ability with foreign students, and supplementing their knowledge of foreign languages. Students have opportunities to study, perform research or have internships in foreign higher education institutions and science institutes within the ERASMUS program, as well as carry out part of their research activities at foreign universities in the framework of research projects. The RTU also strongly supports international mobility as an indispensable part of a modern and innovative university, providing students to gain needed experience and to contribute to international achievements of RTU in studies and research, which are the best affirmation of their quality (<https://www.rtu.lv/en/internationalization>).

Three mobility of doctoral students were carried out in the study year 2013/2014, two of them were internships at higher education institutions in Poland and Germany, and one was within the framework of ERASMUS program at the Kaunas University of Technology in Lithuania. In the study year 2018/2019 two Ph.D. students used mobility visits, one of them had an internship in Finland at Ikaalinen Design and Crafts College (IKATA) and one participated in training at the Kaunas University of Technology in Lithuania. In addition, students' visits to the domestic and international undertakings operating in the industry and trade fairs were carried out, as well as participation in events of various scales (workshops, seminars, summer schools, etc.) in the years 2016 - 2019 of this evaluation period. As can be seen in the SAR, the academic staffs' objective assessment is that Ph.D. students insufficiently use mobility opportunities, therefore, they intend to strengthen the mobility of Ph.D. students in the coming period to ensure transfer and integration of international experience and research practice in the research processes, which, according to experts opinion, is also necessary.

Within the framework of incoming mobility, eight doctoral students visited IDT over the period from 2014 to 2017 for various periods. Based on this, the expert group believes that the doctoral study programme is well integrated into the international research environment.

Recognition of study courses completed during the mobility is done based on the order of the RTU Study Vice-Rector of 29 October 2014 No. 01000-1.1/240 "On amendments in the procedure of organisation of Erasmus+ student mobility" and order of 4 April 2016 No. 02000-1.1/29 "On the procedure of recognition of study courses completed at other higher education institutions and study programs".

## Conclusions by specifying the strengths and weaknesses

The main objectives and learning outcomes of the study programme are clear and well-focused. The content of study courses and implementation of the study programme ensures the achievement of the aims and learning outcomes indicated in the study programme. However, constant work is needed to secure the newest literature. The desire of students for greater free choice of compulsory elective courses should be taken into account. The topics of the doctoral dissertations support six research directions of the study programme and are in line with scientific trends. However, it has been observed that the connection can be improved between doctoral dissertations' topics and the needs of industry. The teaching methods for implementation of study courses, as well as the assessment methods, comply with the specifics of the content of the study course and students' needs and contribute to the achievement of the aims and learning outcomes. Outcomes of the surveys conducted among students and graduates are used to improve the quality of studies. The overall activity of students and graduates in surveys is low. The results of employers' surveys were not observed in the SAR report and the annexes. Academic staff is aware that students insufficiently use mobility opportunities, therefore, they encourage and support outgoing mobility of doctoral students and intend to strengthen the mobility.

### Strengths:

1. Clear overview of main aims, knowledge, and skills that the students should acquire.
2. The content of study courses and implementation of the study programme ensures the achievement of the aims and learning outcomes indicated in the study programme.
3. The surveys conducted among students and graduates are used to improve the quality of studies.
4. Encouraging and supporting outgoing mobility of doctoral students.
5. Motivated students, satisfied with their studies.

### Weaknesses:

1. Students are mostly unable to choose compulsory elective courses on their own.
2. Lack of integration of scientific research into the industry.
3. The overall activity of students and graduates in surveys is low. It is not clear whether an employers' survey was conducted and taken into account to improve the quality of studies.

## 3. Resources and Provision of the Study Programme

### Analysis

The doctoral study programme is implemented in modern auditoriums in the building at K psalas 6, where DTI is located together with the Faculty of Architecture and RTU Design Factory. Three fields of scientific activity are defined for the study programme - the science of lignin-containing fiber materials, the science of textile fiber materials, and the science of polymer fiber materials.

The main infrastructure objects available to ITD doctoral students are:

- Two measurement laboratories (16.7 m<sup>2</sup>; 38.4 m<sup>2</sup>; 21.6 m<sup>2</sup>) - one of them is suitable for various research and experiments related to nanocoatings and extraction of nanofibers from polymer solutions.
- Anthropometry Laboratory (51.8 m<sup>2</sup>)
- Textile Research Laboratory (59.1 m<sup>2</sup> and 77.1 m<sup>2</sup>)
- CAD / CAM Laboratory of Clothing and Textile Design (53.5 m<sup>2</sup>)
- Modeling and design laboratory (79.7 m<sup>2</sup>)
- Sewing Machine Mechanics and Embroidery Laboratory (46.8 m<sup>2</sup>)
- Knitwear and textile laboratory (73.6 m<sup>2</sup>)
- Timber Research Laboratory (29.4 m<sup>2</sup>)



● Wood technology and assembly workshop (375.4 m<sup>2</sup>). (SAR p.168-169)

Measurement laboratories are equipped with Bruker AFM atomic force microscope; Permatest SENSORA device for determining the heat resistance and vapor permeability of cloth; Fungilab viscosimeter; Motic microscope 169 with a camera and 100x possible magnification; magnetic and mechanical mixers; Rhopoint device for determining the surface gloss. These are modern high-precision devices with a wide range of applications.

Anthropometry Laboratory is a unique tool for applying scientific ideas to real products.

The Textile Research Laboratory and CAD / CAM Laboratory of Clothing and Textile Design are well equipped too.

Sewing Machine Mechanics and Embroidery Laboratory and Knitwear and textile laboratory shows basics and does not go even close to modern industrial equipment solutions.

Timber Research Laboratory shows some hand operating tools but wood technology assembling workshop works without the space for assembling.

Information and databases provided for the study process of Ph.D. students, as well as for the academic staff and employees are mainly available in the electronic study environment ORTUS. By using ORTUS, students and academic staff have access to extensive information resources, including electronic library resources which are continuously updated. Within the RTU ORTUS environment, students have access to international databases: Web of Science, EBSCO, SCOPUS, Science Direct, SpringerLink journals and books with full text, and other information resources. Specialized necessary literature sources are provided by the relevant profile structural unit which procures annual subscriptions within the unified procurement of the RTU library (SAR p.168).

The RTU Scientific Library (SL) provides the necessary information to ensure RTU study process and research activities, as well as provides a library, bibliographic, and information services to RTU students, academic and general staff. The Library holds more than 1.3 million printed documents and e-resources in RTU industry-specific databases. The Library stock is located at the Central Library, the Study Material Subscription, the Chemistry Branch, the Transport Branch, and Study and Research Centres in Daugavpils, Liepāja, Cēsis, and Ventspils. In the reporting period, a total of 91 special book units were purchased. Both the electronic catalog and RTU portal ORTUS can be used to reserve the library resources remotely. Remote access to databases is also provided (SAR p.57). At the request of the academic staff of the specialization field "Clothing and Textile Technology", 42 new books were purchased by the SL amounting to 3956.42 EUR in the period of 2013 - 2020. At the request of the academic staff of the specialization field "Material technology and Design", 49 new books were purchased by the SL amounting to 2975.86 EUR in the period of 2013 - 2020. (SAR p.57) This means that an average of 13 books were purchased each year between 2013 and 2020. Compared to the total amount of 1.3 million printed documents in SL funds (SAR p. 56).

The Research Support Fund provides financial support for research activities and doctoral students for the publication of their scientific articles. RTU Doctoral Grants, which cover the costs of at least 650 working hours as a research assistant and/or researcher and provide finances for the purchase of research materials (SAR p.170).

Doctoral students have the opportunity to develop parts of their research work in foreign and Latvias' universities and research institutes. Such as the Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) in Germany; The School of Design;-the University of Leeds, UK; The Institute of Solid State Physics at the University of Latvia (LU); RWTH Aachen University in Germany, and others. An example of the framework of the ERASMUS program is Dr.sc.ing. E. Kirilovs, by developing his Ph.D. thesis, performed a part of the experiments at Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) in Potsdam, Germany, by participating in hemp harvesting and cutting works, learning untraditional methods and technologies, as well as developing new structures of composite materials and testing them.

There is good cooperation with the Institute of General Chemical Technology and the Department of Polymer Materials Technology. IDT Department of Design and Materials Technologies and

Department of Clothing and Textile Technologies, also the Institute of General Chemical Engineering and the Department of Polymer Materials Technology is involved in the implementation of the study process and provides parts of the study courses "Methodology of Research" and "Fibre Materials Science". In the laboratories there is a scanning electron microscope with energy dispersive X-ray spectroscopy detector, X-ray diffractometer, Fourier transformation infrared spectroscope, picnometers, BET surface area analysis equipment, and other devices. (SAR p.170)

100% state budget funding is used for the implementation of the study programme. In the report period from 2013/2014 to 2019/2020, funding has increased by 33% evenly over the years. IDT funding has been stable over the last three years and is on the rise. The increase in funding compared to the previous year (2018/2019) is 9.47%. (SAR p. 46) From experts' opinion finances are sufficient and align with the real demand of this study programme.

Resources are sufficient for implementing study programmes in both - Latvian and English. Funding for studies in English is not allocated separately but can be taken from a decentralized RTU budget, to which each head of the structural unit has remote access to operational financial information on the budget of the structural unit, including the scheduled workload and allocated funding in future periods for implementation of study programs and study courses. At the beginning of every fiscal or budget year, the head of a structural unit plans the works of the structural unit, including wages for the academic staff subordinated to the relevant head, and develops a procurement plan for the next year for providing implementation of the study program or courses. State budget funding is used for the implementation of the study programme. (SAR p. 167)

### **Conclusions by specifying the strengths and weaknesses**

The study provision, scientific support, informative provision, material and technical provision, and financial provision comply with the specific demand of this Ph.D. study programme and this indicates the possibility to ensure a high-quality study process also in the future.

The study provision and the scientific support, including the resources provided within the cooperation with other scientific institutions and institutions of higher education, comply with the requirements for the implementation of the doctoral study programme.

#### **Strengths:**

1. The state provides an increasing budget.
2. Good cooperation with the Institute of General Chemical Technology and the Department of Polymer Materials Technology.
3. It is possible to use RTU centralized funding from the Science Support Fund, a doctoral grant.

#### **Weaknesses:**

1. Sewing Machine Mechanics and Embroidery Laboratory and Knitwear and textile laboratory needs to be improved.
2. Timber Research Laboratory and wood technology assembling workshop need to be improved.

## **4. Teaching Staff**

### **Analysis**

During the report period, there have been substantial changes in the academic staff composition of the study programme, however, with positive trends as the number of academic staff members has increased by +42% (SAR, p. 172). The average age has decreased in almost all of the groups of academic staff members, which indicates the renewal of generations of the academic staff. During the report period, 5 members of the academic staff have received their Ph.D. degree allowing them to apply for the positions of the associated professor, leading researcher, and lecturer (SAR, p. 172).

This has resulted in a considerable reduction of the average age of the academic staff of the study programme as well as it shows that the university takes measures to avoid sudden generational change. The overall average age has decreased by 17 years, 8 of the lecturers belong to the age group below 40 years (SAR, p. 173). Taking into account all of the previously mentioned, in experts' opinion, there are no visible risks in the structure of the teaching staff and the possible negative effects are targeted efficiently.

The academic staff of the study programme consists of 18 members - 3 professors, 6 associated professors, 5 leading researchers, 3 docents, and 1 lecturer. Nine members of the academic staff involved in the study programme have the authority of an expert in the field of engineering science and technologies of the Science Council of Latvia (SAR, p.174). All the academic staff members involved in the implementation of this study programme hold a Ph.D. degree. Based on the information provided in SAR from pages 174.-180., as well as Annex 6 (CV's of academic staff members), the experts are convinced that the qualifications of the teaching staff members comply with the requirements for this study programme and regulatory enactments. For the academic staff members who implement their courses in English, the language level is adequate (Annex "Macibspeki\_Teaching\_staff"). Experts were mostly assured of the quality of English level during the onsite visit - the overall level of spoken English was mostly good, however, some of the academic staff members could benefit from improving their spoken English, even though the level mentioned in the Annexes was C1.

As of 2013, the scientific research performed by the academic staff and their results in the fields relevant to the Ph.D. study programme has been published in 403 scientific articles, 2 monographs, and chapters of six scientific monographs. 234 of them have been published in the SCOPUS database and 95 in SCOPUS and/or WoS database (SAR, p. 181). During the report period, the academic staff involved in the study programme implemented and participated in international and national scientific projects as project managers, main performers, leading researchers. The ERDF (European Regional Development Fund) research project "Synthesis of textile surface coating modified in nano-level and energetically independent measurement system integration in smart clothing with functions of medical monitoring" can be mentioned as an example, where, besides the scientific supervisor of the project, several academic staff members and Ph.D. students were involved, hence the contribution can be seen not only for the academic staff members but also for the students (SAR, p.189). There seems to be an increase in the number of post-doctoral projects implemented and commenced by the new scientists as seen in the SAR, p. 188.-189 - in the years 2019-2021 three post-doctoral projects were started as in comparison to the year 2018, where only three projects remained. Judging from the information given to the experts in the SAR from pages 180.-189., the experts are convinced that the research related projects contribute to the implementation of a high-quality doctoral study programme, by allowing Ph.D. students to be involved as well as the competencies and research results being integrated into the study courses (see 4.4.).

Experience, knowledge, and modern research methods acquired in the realization of scientific research projects are integrated into the study process. The academic personnel and Ph.D. students are actively involved in the scientific research locally and internationally of the topical matters of the textile and clothing technology sub-field, wood materials, and product technology sub-field of the material science field. For example, the aforementioned ERDF research project "Synthesis of textile surface coating modified in nano-level and energetically independent measurement system integration in smart clothing with functions of medical monitoring" involved not only academic staff members but also Ph.D. students in its implementation. Research directions conform with the defined state priorities and are linked with RIS3 (Smart Specialization Strategy for Research and Innovation) specialization areas (SAR, p. 189). Results of each research project are integrated into the study process. One of the several examples given - a project is being carried out about smart material, transferring heat insulation, which is suitable for construction, for accumulation and return

of latent heat with improved sound insulation properties, by using environmentally friendly components and bio-technologies (SAR, p. 191). The results and methods of this project are integrated into the relevant study courses for this study programme. The results of the ERDF research project "Synthesis of textile surface coating modified in nano-level and energetically independent measurement system integration in smart clothing with functions of medical monitoring" are integrated into study courses "Research Methodology", "Specialised Bio- and Nanotechnologies", "Development and Research of Smart Textiles".

The relevant publications and artistic work provided to experts are published in journals cited in Scopus or WoS. From the information available to the experts 313 out of 345 scientific publications are indexed in WoS and/or Scopus from the year 2013 until 2021, the average being 40 indexed publications per year within all of the academic staff members (SAR, Annex 8 "Publications\_patents"). Additionally, there are 55 publications in conference proceedings, which are also indexed by the WoS and/or Scopus (SAR, Annex 8 "Publications\_patents"). There are a couple of publications found in the aforementioned annex, which has 20-30, reaching up to even 70 citations in both - Scopus and WoS databases. As most (around 90% - SAR, Annex "Macibspeki\_Teaching staff") of the academic staff members involved in the implementation of this programme are also involved in the implementation for the other BSc programmes, as well as the MSc programme it is impossible to separate the involvement in scientific research specifically for teachers involved in the Ph.D. programme "Fibre Materials Science". An example was found with one academic staff member, who teaches 2 courses regarding bio and nanotechnologies only for the Ph.D. programme - 231 publications were found by the experts with the academic staff member being either as a first or a co-author in local and international journals from the period of 2013 till 2021 (SAR, Annex 8 "Publications\_patents"). The number of the Scopus/WoS indexed publications is good, however, there are still 121 publications in the RTU scientific journal and RTU press (RTU conference proceedings) (SAR, Annex 8 "Publications\_patents"). The publication amount increase on an international level within journals with Scopus and/or WoS index would be beneficial for the university in the future. Ideally, the Scopus and/or WoS indexed publications should be double the amount published in the local journals and RTU press.

Exchange of experience and information related to the study work takes place at the meeting of the IDT academic staff (monthly), during attestation of Ph.D. students in the structural unit and the faculty (twice a year), in academic conferences (annual) at the meetings of the promotion council and at scientific workshops, conferences. Improvement of study courses by the cooperation of the academic staff takes place regularly because in the majority of cases several lecturers are involved in the implementation of study courses. Twice a year, by evaluating the progress of the work of Ph.D. students, also the content and sequence of study courses are discussed between all of the involved academic staff members (SAR, p. 192). As mentioned before, there are several and regular collaboration mechanisms implemented within the academic staff members, which in expert opinion are enough to ensure quality improvement and contribution to the study programme.

## **Conclusions by specifying the strengths and weaknesses**

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The qualifications and research records of the academic staff members are on a good level, however, the proportion between local and international publications could be increased. In some cases, the spoken English language level might be improved for the teachers implementing their courses in English. The involvement of the academic staff in research projects is on a good level, both on the international and local scope, together with providing a high-quality contribution to the study programme. The obtained information in scientific research projects is efficiently used in the study process. There are good collaboration mechanisms in place between the academic staff members.

#### Strengths:

1. Strong link between the scientific research projects and the study course content.
2. Increase in the number of post-doctoral projects implemented at the institute.
3. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.

#### Weaknesses:

1. Discrepancies of the provided level of English language levels for some academic staff members with the spoken English level heard during the onsite visit.
2. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.

### 5. Assessment of the Compliance of the Study Programme "Fibre Materials Science"

#### Requirements

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

#### **Assessment of compliance:** Fully compliant

The sample of diploma is provided in the attachment and complies with the regulations.

2. Documents confirming that the higher education institution/ college will provide the students with the options to continue the acquisition of education in another study programme or at another higher education institution/ college (a contract with another accredited higher education institution/ college), in case the implementation of the study programme is discontinued.

#### **Assessment of compliance:** Partially compliant

RTU has concluded an agreement with the University of Life Sciences and Technology of Latvia (LLU) that the student will be able to continue studies in the academic doctoral study programme "Wood materials and technology". However, it should be taken into account that LLU offers this study programme only with specialization in wood technology which is not useful for students with specialization in clothing and textile. LLU study programme is available in English.

3. Document confirming that the higher education institution/ college guarantees to the students a compensation for losses if the study programme is not accredited or the licence of the study programme is revoked due to the actions of the higher education institution/ college (actions or failure to act) and the student does not wish to continue the studies in another study programme.

#### **Assessment of compliance:** Fully compliant

Confirmation of compensation of losses is available in the annex (Par\_zaudējumu\_kompensāciju.edoc).

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

#### **Assessment of compliance:** Fully compliant

The CV of the teaching staff provides evidence of the proficiency of the official language.

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

**Assessment of compliance:** Fully compliant

The teaching staff members to be involved in the implementation of this study programme has sufficient English knowledge. Full compliance can be found in RTU Vice-Rector's for Academic Affairs confirmation and also in the annex "academic staff CV" and annex "Macibspeki\_Teaching\_staff.xlsx".

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

**Assessment of compliance:** Fully compliant

CV of the teaching staff and annex "LZP eksperti doktora programmā" provide information about LZP experts.

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

**Assessment of compliance:** Fully compliant

Annex "AL 55. pants par prof. skaitu akadēmiskās programmās" confirms the compliance with requirements.

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

**Assessment of compliance:** Fully compliant

The sample of the study agreement is attached in the annex and complies with the requirements.

- 9 9. The descriptions of the study courses and the study materials have been prepared in all languages in which the study programme is implemented, and they comply with the requirements set forth in Section 56.1, Paragraph two and Section 56.2, Paragraph two of the Law on Institutions of Higher Education.

**Assessment of compliance:** Fully compliant

The descriptions of the study courses and the study materials for this study programme have been prepared according to the requirements.

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

**Assessment of compliance:** Not relevant

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

**Assessment of compliance:** Fully compliant

The annex "Nr\_90\_RTU\_Dokt\_tekstils\_par\_250\_stud" confirms compliance with this requirement.

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

**Assessment of compliance:** Not relevant

- 13 13. The joint study programmes comply with the requirements prescribed in Section 551, Paragraphs one, two, and seven of the Law on Institutions of Higher Education (if applicable).

**Assessment of compliance:** Not relevant

- 14 14. Each member of the academic staff has either publications published in reviewed editions within the last six years, including international editions (if they have worked for a shorter period of time, the number of publications shall be in proportion to the work period), or artistic creation achievements (for instance, exhibitions, films, theatre performances, and concert activity), or a five-year practical work experience (except for the experience in the implementation of the study programme) in accordance with the Law on Institutions of Higher Education.

**Assessment of compliance:** Fully compliant

Approved by investigating the SAR, CVs, and annex "Publications of the teaching staff in the field of materials science of the study field "Production and processing".

- 15 R5 - Overall rating

**Assessment of compliance:** Partially compliant

The study programme mostly, but in the one aspects still partially complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. See more in recommendations regarding this study programme.

## **Requirements (R6-R8)**

- 1 R6 - The compliance of the 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 ensuring the achievement of the learning outcomes.

**Assessment of compliance:** Fully compliant

The compliance of the study provision, scientific support, informative provision (including libraries), material and technical provision, and financial provision with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes is sufficient.

- 2 R7 - The compliance of the qualification of the academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments.

**Assessment of compliance:** Fully compliant

The qualifications and research records of the academic staff members are on a good level. The involvement of the academic staff in research projects is on a good level, both on the international and local levels. There are good collaboration mechanisms in place between the academic staff members (See analysis in Part 4 of this report).

- 3 R8 - The study programme leading to the master or doctoral degree is based on the advances and findings in the relevant field of science or artistic creation.

**Assessment of compliance:** Fully compliant

The study programme leading to the doctoral degree is based on the advances and findings in the Fibre Materials Science (according to SAR and see analysis in Part 4 of this report).

**Conclusions by specifying the strengths and weaknesses**

The name of the programme, the goal, the results, admission criteria, and the requirements for graduating from the programme are aligned.

The main objectives and learning outcomes of the study programme are clear and well-focused. The content of study courses and implementation of the study programme ensures the achievement of the aims and learning outcomes indicated in the study programme. However, constant work is needed to secure the newest literature. The desire of students for greater free choice of compulsory elective courses should be taken into account. The topics of the doctoral dissertations support six research directions of the study programme and are in line with scientific trends. However, it has been observed that the connection can be improved between doctoral dissertations' topics and the needs of industry. The teaching methods for implementation of study courses, as well as the assessment methods, comply with the specifics of the content of the study course and students' needs and contribute to the achievement of the aims and learning outcomes. Outcomes of the surveys conducted among students and graduates are used to improve the quality of studies. The overall activity of students and graduates in surveys is low. The results of employers' surveys were not observed in the SAR report and the annexes. Academic staff is aware that students insufficiently use mobility opportunities, therefore, they encourage and support outgoing mobility of doctoral students and intend to strengthen the mobility.

The study provision, scientific support, informative provision, material and technical provision, and financial provision comply with the specific demand of this Ph.D. study programme and this indicates the possibility to ensure a high-quality study process also in the future.

The study provision and the scientific support, including the resources provided within the cooperation with other scientific institutions and institutions of higher education, comply with the requirements for the implementation of the doctoral study programme.

The university undertakes measures to avoid the negative impact of the study programme based on the changes in academic staff member composition. The qualifications and research records of the academic staff members are on a good level, however, the proportion between local and international publications could be increased. In some cases, the spoken English language level might be improved for the teachers implementing their courses in English. The involvement of the academic staff in research projects is on a good level, both on the international and local scope, together with providing a high-quality contribution to the study programme. The obtained information in scientific research projects is efficiently used in the study process. There are good collaboration mechanisms in place between the academic staff members.

**Strengths:**

1. The aims and objectives are well defined and attainable.
2. The admission requirements are well defined.
3. Strong link between the scientific research projects and the study course content
4. Increase in the number of post-doctoral projects implemented at the institute.
5. Clear overview of main aims, knowledge, and skills that the students should acquire.
6. The curriculum development takes into consideration research results on needed competencies.
7. The surveys conducted among students and graduates are used to improve the quality of studies.



8. Encouraging and supporting outgoing mobility of doctoral students.
9. Motivated students, satisfied with their studies.
10. Some scientific publications by the involved academic staff members have a high citation count in both - WoS and Scopus databases.
11. The content of study courses and implementation of the study programme ensures the achievement of the aims and learning outcomes indicated in the study programme.
12. The state provides an increasing budget.
13. Good cooperation with the Institute of General Chemical Technology and the Department of Polymer Materials Technology.
14. It is possible to use RTU centralized funding from the Science Support Fund, a doctoral grant.

#### Weaknesses:

1. Discrepancies of the provided level of English language levels for some academic staff members with the spoken English level heard during the onsite visit.
2. Students have little free choice of compulsory elective courses.
3. Lack of integration of scientific research into the industry.
4. The overall activity of students and graduates in surveys is low. It is not clear whether an employers' survey was conducted and taken into account to improve the quality of studies.
5. Sewing Machine Mechanics and Embroidery Laboratory and Knitwear and textile laboratory needs to be improved.
6. Timber Research Laboratory and wood technology assembling workshop need to be improved.
7. The proportion between local scientific publications and publications in international Scopus/WoS indexed journals should lean more towards the international Scopus/WoS journals, which is not clearly seen at the moment.
8. There is no agreement with the university, which in case RTU stops implementing the study programme, would be ready to take over foreign students and students who have chosen the specialization of Clothing and Textile Production Technologies.

### Evaluation of the study programme "Fibre Materials Science"

Evaluation of the study programme:

Good

### 6. Recommendations for the Study Programme "Fibre Materials Science"

#### Short-term recommendations

1. Within two years, sign an agreement with another university, which, in case RTU terminates the study programme, would be ready to take over foreign students who have chosen the specialization of Clothing and Textile Production Technologies.

#### Long-term recommendations

1. Sewing Machine Mechanics and Embroidery Laboratory and Knitwear and textile laboratory needs to be improved in four years.
2. Timber Research Laboratory and wood technology assembling workshop need to be improved in four years.
3. Some academic staff members should improve their English level until the next accreditation.

4. Until the next accreditation, the number of publications in international Scopus/WoS indexed journals should be increased, ideally so it would double the publications in local/RTU press scientific journals.
5. Until the next accreditation, increase the free choice of compulsory elective courses.
6. Until the next accreditation, increase integration of scientific research into the industry.
7. Until the next accreditation, improve the overall activity of students and graduates in surveys and improve the employers' survey about the necessary improvement of the quality of studies.
8. Until the next accreditation, update curricula and library collection with recent literature.

### **III. Assessment of the Requirements for the Study Field and the Relevant Study Programmes**

#### **III. Assessment of the Requirements for the Study Field and the Relevant Study Programmes**

##### **Assessment of the Requirements for the Study Field**

<b>Requirements</b>	<b>Requirement Evaluation</b>			<b>Comment</b>
R1 - Pursuant to Section 5, Paragraph 21 of the Law on Institutions of Higher Education, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study direction whilst implementing their internal quality assurance systems:	Fully compliant			RTU has several mechanisms for study quality improvement, including RTU Quality Policy as well as RTU Excellence Approach and the mechanisms for evaluating teaching staff, getting feedback, and updating relevant study programmes (SAR, pp. 9-10), however, in experts opinion there is room for improvement in regards to feedback mechanisms and so-called "top to down" communication in order for the system to be even more effective. (Please see analysis in Part 2 of this report)

Requirements	Requirement Evaluation			Comment
R2 - The cooperation with different organisations from Latvia and abroad implemented within the study direction ensures the achievement of the aims of the study direction.	Fully compliant			The study field has developed successful cooperation with local entrepreneurs, organizations, state institutions, as well as local universities and universities from other countries. According to Part 5 of this report, there are some shortcomings (insufficient cooperation with foreign partners, insufficient number of foreign students and academic staff) that need to be improved, but they do not directly affect this assessment.
R3 - Compliance of scientific research and artistic creation with the development level thereof (if applicable).	Fully compliant			There is evidence of scientific publications, opinions and research projects. According to Part 4 of this report, there are some shortcomings (insufficient international research) that need to be addressed, but they do not directly affect this assessment.
R4 - Elimination of the shortcomings and deficiencies identified during the previous assessment of the study direction, if it has been conducted, or the implementation of the provided recommendations.		Partially compliant		Significant improvements have been made. However, there is still room for improvement in the international dimension of studies (inbound and outbound mobility, English language courses) a lack of a plan to attract foreign students (See analysis in Part 6 of this report).

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

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)

<b>No.</b>	<b>Study programme</b>	<b>R5</b>	<b>R6</b>	<b>R7</b>	<b>R8</b>	<b>Evaluation of the study programme (excellent, good, average, poor)</b>
1	Clothing and Textile Technology (42542)	Partially compliant	Fully compliant	Fully compliant	Not relevant	Good
2	Material Technology and Design (42548)	Partially compliant	Fully compliant	Fully compliant	Not relevant	Good
3	Design Engineering (47548)	Partially compliant	Fully compliant	Fully compliant	Fully compliant	Good
4	Fibre Materials Science (51548)	Partially compliant	Fully compliant	Fully compliant	Fully compliant	Good

### **The Dissenting Opinions of the Experts**

No