

Expert group joint opinion

Evaluation Procedure: Assessment of Study Field

Higher Education Institution: Riga Technical University

Study field: Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering

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

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The study field "Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering" realized in one of the biggest and leading universities in Latvia - Riga Technical University (RTU). For accreditation are submitted 20 study programmes in the study field including:

- 10 Bachelor level study programmes: 2 academic Bachelor study programmes without obtaining of professional qualification, 7 professional Bachelor study programmes with obtaining of professional qualification and 1 joint with Riga Stradins University professional Bachelor study programme with obtaining of professional qualification;
- 8 Master level study programmes: 4 academic Master study programmes without obtaining of professional qualification; 4 professional Master study programmes with obtaining of professional qualification;
- 2 Doctor level study programmes.

The aims of the study field "Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering" are clearly defined in the Self Evaluation Report /Self Assessment Report (SER, SAR) and attainable confirmed by the documents „Development Plan for the Study Field“, „Quality Policy of RTU“ and “RTU Strategy for 2021-2025”. The study field study processes implementation is supported by highly organized managerial administration, well-developed and successfully functioned internal quality system of Riga Technical University.

The aims of the study field and the relevant study programmes and the strategy to attain the aims is set in very tight cooperation with the Association of Mechanical Engineering and Metalworking Industries of Latvia (MASOC) and reflects the real industry needs of the national economy. The support structure provided by the administrative and technical staff contributing to meeting the needs of the Study Field and respective programmes is described and the list of main lab equipment and the study environment infrastructure is given in the Self Evaluation Report (section 2.3.2) and in more detail next to each programme description is detailed enough and the new lab building environment is impressive. The Faculty Advisory Board, which provides its own vision for improving the supply of study programmes in line with the sectoral needs and market trends.

Procedures for the admission and examinations are sufficiently described in the presented Self Evaluation Report and interviews with the teachers and students confirmed the common understanding of these procedures. All the employers confirmed clear support for the academic principles during the studies.

In the study field implementation are taken into account the interests of all stakeholders. The stakeholders are involved in the development and improvement of study programmes in the study field. The administration, students, teaching staff and employers are collaborating in close contact for better achievement of the objectives, tasks and results of the study programme in the field. The students and teachers confirmed during the interviews that they are aware about “RTU Quality Policy” and “Regulation on the Assessment of Learning Outcomes”, “Regulation on Final Examinations at RTU”, “Study Field Development Plan”, etc. The experts noticed during the interviews that the staff of the Faculty and graduates are really keen on the study field and are ready to go ahead with improving the study programmes. The management of the Faculty has already initiated some good steps to improve the management having a clear “Study Field Development Plan” and introducing several changes into the field programmes described in the

Report and has potential for further improvements.

The in the study field available technical and informative resources, provision, libraries and laboratories are impressive, highly qualified teaching staff is active in scientific and applied research, in publications, participating in seminars, projects and conferences. An enthusiastic and close team with a good mix of scientific and industrial experience.

High level and serious approach to the scientific development of teaching staff at RTU positively impacts the teaching staff and students.

The good and broad framework of RTU cooperation with other scientific institutions and higher education institutions in the doctoral study programme implementation and research activities provide very positive field for students for achieving learning and research outcomes.

The all mentioned facts regarding the planning, structure, strategy, organization of studies in the RTU, Faculty and Departments resulted in the positive panel assessment of compliance of study field and study programmes with minimal weaknesses and drawbacks. Recommendations for improving are provided.

I - Assessment of the Study Field

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1.1 Management of the Study Field

Analysis

The aims of the study field “Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering” are clearly defined in the Self Evaluation Report (SER, SAR) and attainable confirmed by the documents Paragraph 6 of RTU Constitution stating “The task of RTU is to train scientists, engineers, economists, administrative and management specialists, architects and academic staff members of international qualification, ensure indivisibility of studies and research and develop academic fields related to RTU profile, paying special attention to the priority scientific fields of Latvian economy.”, „Development Plan for the Study Field”, „Quality Policy of RTU” and “RTU Strategy for 2021-2025”. The study field and the relevant study programmes comply with the main directions of the “National Development Plan for 2021-2027 of Latvia” taken as basis for the RTU new strategy defining four main objectives for the next programming period: excellent science, quality studies and sustainable valorisation and institutional excellence. The programmes of the study field “Mechanics and Metalworking, Thermal Energy, Thermal Engineering and Mechanical Engineering” at the Faculty of Mechanical Engineering, Transport and Aeronautics are in line with the National Development Plan as well as with the RTU Strategy Documents above. The aims of the study field and the relevant study programmes and the strategy to attain the aims is set in very tight cooperation with the Association of Mechanical Engineering and Metalworking Industries of Latvia (MASOC), which unites over 160 leading machinebuilding and metalworking manufacturing enterprises and the related industry companies. The above is in accordance with the Latvia's long-term economic strategy approved by the Cabinet of Ministry and the guidelines for industrial development (Documents: On Priority Areas in Science in 2018-2021 and Guidelines on National Industrial Policy for 2021-2027).

The Study field aims the objectives of the University defined in the general RTU Strategy Documents and implements them in the field of Mechanics and Metalworking, Thermal Energy, Thermal Engineering and Mechanical Engineering where each study programme defines and specifies respective sub-goals in the framework of the general aims The sub-goals of each study programme

are given in the Self Evaluation Report. It is worth mentioning that all the programmes of the Study Field take into account the requirements of the respective level European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF).

Interviews with the management of RTU and the Faculty of Mechanical Engineering, Transport and Aeronautics and staff of the Institute of Aeronautics, Institute of Biomedical Engineering and Nanotechnologies, Institute of Transport and Institute of Mechanics and Mechanical Engineering demonstrated the dedication and deep involvement of the Faculty and Directors of the Study Programmes in achieving the aims set. The team that compiled the Self-Assessment Report is dedicated and well prepared. The Management structure of the Faculty has gone through many changes the years from the last assessment discussed and reasoned sufficiently in the Self Evaluation Report and is now logical and supports the Study Field aims set. The Self-Assessment Report assures that the Faculty and Institutes management has a clear understanding of the aims of the study programmes - as the topicality of the study field is determined by the requirements and possibilities of the national labour market and the meeting of the experts with the employers and given in more detail on the web page of the Association of Mechanical Engineering and Metalworking Industries of Latvia data (<https://www.masoc.lv/en/members/about-sector>) and discussed in the Self Evaluation report pages 24-28. RTU is the biggest higher education institution that provides the most comprehensive and wider training of specialists in the field of Mechanics and Metalworking, Thermal Energy, Thermal Engineering and Mechanical Engineering in Latvia. The Study Field development is aimed and in accordance with the University mission and strategic plans defined in documents "RTU Strategy for 2021-2025", "RTU Excellence Approach" and "Study Field Development Plan". A significant boost in infrastructure development has been the new joint infrastructure in Ķīpsala - the Laboratory House with numerous high level laboratories and renovated Library with good access to scientific e-databases and solid collection of the hard copy textbooks.

The detailed SWOT analysis is given in the Self Evaluation Report on the pages 29-32 identifying the strengths, weaknesses, opportunities and threats. As from the deep analysis in the Report the following points should be stressed according to our observations:

strengths - qualified academic staff with a high potential for scientific research and industrial cooperation, tight connections with employers and several laboratories already on very good level (Metrology Laboratory, Automotive Diagnostic Laboratory, Micro and Nanotechnology Laboratory (clean area) and tight cooperation with the industry associations;

weaknesses - the problem of renewal of academic staff, insufficient international cooperation of academic staff and insufficient international research projects, large drop-out rate of the students on the first year of the study;

opportunities - further financing of the programme development from the EU (structural) funds, as well as other funding sources of programs and projects, involve students in scientific research more extensively and to create lifelong learning;

threats - academic staff, especially professors, are of the pension or pre-pension age, students are not sufficiently involved in research activities.

During the visit, experts noticed that despite the specialists' preparation and teaching programmes development there are gaps in meeting the international collaboration and research priorities. The methodological and study materials (especially e-materials) prepared in ORTUS e-learning platform are comprehensive and well prepared, though the material and technical basis of some programmes (Industrial Design, Railway Engineering) could be improved especially considering the new technology trends in rising involvement of ICT technologies and modern lightweight and eco-friendly materials and respective manufacturing technologies in the Industrial Design and the newest hard-

and software introduction for the future railway solutions as experts noticed during the lab visits. Despite this the experts noticed real contribution of the employers into the development of the laboratories, especially the Metrology laboratory with the Mitutoyo equipment, Automotive testing laboratory with the Bosh equipment and Medical Engineering and Medical Physics programme laboratories with radiometric and nanotechnology equipment. The students of all the programmes mentioned during the interviews that they would like to have more practical classes and practical project based courses. Even more the experts noticed some real interest of motivated students into running research projects in RTU and options to participate in this kind of projects. The students of all the programmes mentioned as one of the main problems for the high drop-out rate during and after the first year is Mathematics course where the student's weak preparation is agglomerated with the way-out independent self study requirements and weak interconnection of mathematics theory and engineering tasks.

The documents "RTU strategy for 2021-2025" and "Study Field Development Plan" describe sufficiently future aims and plans and the students and academic staff the expert group met were aware of the documents and their content and related plans, which is an indicator of the involvement of both - the students and teachers in the development of the Study Field and Study Programmes. The support structure provided by the administrative and technical staff contributing to meeting the needs of the Study Field and respective programmes is described and the list of main lab equipment and the study environment infrastructure is given in the Self Evaluation Report (section 2.3.2) and in more detail next to each programme description is detailed enough and the new lab building environment is impressive. The Faculty Advisory Board, which provides its own vision for improving the supply of study programmes in line with the sectoral needs and market trends.

Common academic integrity principles and mechanisms are described in the Self Evaluation Report and the University documents (mainly "RTU Quality Policy", "Code of Academic Integrity", "Analysis of the breach of academic integrity", "Statement of the Breach of Academic Integrity by a Student" and confirmed during the interviews with the students and teachers. It was confirmed during the interviews that checks for plagiarism are used for the student homeworks and final projects. RTU has approved the documents defining respective plagiarism policy are in addition to the above mentioned academic integrity documents in "Internal Code of Student Conduct", "Submission Storage of Electronic Copies of Graduation Paper". Use of ORTUS e-learning platform enables the use of the special Moodle plagiarism checking module. Stakeholders are aware of the academic principles as most of them are graduates of the same Faculty or long time employers of the graduates and students doing their internships in respective companies. It was discussed during the interviews that there might be some discrepancies between academic principles and practical industrial requirements, i.e. use of some confidential company related documents, which could not be fully cited in a student work or company requirement to use a kind of client specific references required by the project the student is working for. All the employers confirmed clear support for the academic principles during the studies.

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

The Management and developed managerial documents show good potential for the Study Field and all the programmes. All stakeholders are positive about the study programme and respective need for the specialists. The study programmes comply well with the national and industries' development plans and trends and there isn't questions about the need for the respective Study Field. The Faculty management is aware and following the academic procedures supported with the comprehensive set RTU of documents. Both the Faculty development plans and academic procedures (classes

attendants, procedures for homeworks and examinations, plagiarism rules etc.) are well communicated to the students. The communication with the stakeholders is good though their involvement could be improved during the development of the Study Field.

Strengths:

1. The Faculty and the Study Field have clearly defined aims which are in accordance with the Latvian and regional development policy and real needs of the industry.
2. Dedicated and initiative Faculty managerial staff.
3. Well developed and comprehensive strategic plan documents for the years 2021-2025
4. High awareness and involvement of the Faculty staff and students in the development plans.
5. Well documented and defined academic principles in respective documents.

Weaknesses:

1. Lack of clear Go/No-Go gates and alternative plans in realisation of the Study Field
2. Study Field is based in general on good level R&D activities.
3. The current high drop-out rate does not allow to satisfy the industry needs.

1.2. Efficiency of the Internal Quality Assurance System

Analysis

The Self Evaluation Report (section 2.1 Management of the Study Direction) describes the management and decision-making process at RTU and in the Faculty. Experts noticed during the interviews that the employers and graduates are not always involved in these processes.

Development plans of the study field are defined in the document "Study Field Development Plan" in accordance with the "RTU Strategy for 2021-2025". The brief content and responsible persons are defined in detail in documents "Quality Policy of Riga Technical University" and in the Self Evaluation Report (sections 2.2.2-2.2.4) though the plan does not include the criteria how and when the University or the Faculty will assess whether one or another element of the plan is realized and desired outcomes achieved. The "RTU Management Structure" and "RTU Study Direction Management Structure" describe the study field management structure consisting of main four stages: Vice-Rector for Academic Affairs and Faculty Council; Senate Study Quality and Programs Committee and Study Department; Study Direction Committee with Study Direction Director; Organizational Unit Responsible for Implementation of the Study Program with Head of the Study Program. The respective procedures, the sequence of the procedures, responsible persons and deadlines are described in detail in the document "Procedure for Application, Development Amendment of the Study Programs". The Self Evaluation Report underlines as one of the study field and programmes objectives optimizing RTU study courses. The report describes numerous changes in most of the programmes during the reporting period but it could not be found in the report what are the optimization criteria and how to assess whether the optimization has been successful for the whole study field and for each of the programmes. General optimization target values and the years for these values are given in the "Study Field Development Plan" but the ways how to reach the target values are unclear, for instance how to reduce the drop-out rate of the students considerably and how to assure the sustainability and renewal of the academic staff in the situation where the number of graduates of the doctoral programme is not enough for this and state financing is low for competitive salaries and the number of some year students on some programmes are lower than stated in the document "On minimal number of students in study programmes". As the students and graduates expressed interest in more practical and research activities it might be suggested some synchronization link in between the Study Department and Study Direction Committee and respective organizational units responsible for the research coordination at the Faculty.

The respective procedures, the sequence of the procedures, responsible persons and deadlines are

described in detail in the document “Procedure for Application, Development Amendment of the Study Programs”.

The students and teachers confirmed during the interviews that they are aware about “RTU Quality Policy” and “Regulation on the Assessment of Learning Outcomes”, “Regulation on Final Examinations at RTU”, “Study Field Development Plan”, etc. The experts noticed during the interviews that the staff of the Faculty and graduates are really keen on the study field and are ready to go ahead with improving the study programmes. The management of the Faculty has already initiated some good steps to improve the management having a clear “Study Field Development Plan” and introducing several changes into the field programmes described in the Report and has potential for further improvements.

Students have to pass the practices/internships in a company regulated with documents “Uniform Requirements of RTU Towards Study Programs” and “Sample of Cooperation Agreement” defined in more detail in each study programme. Students mentioned during the interviews that finding the practice place depends a lot of the Head of the Study Programme how much help they are getting to find suitable companies. The professional skills and knowledge are mainly assessed during the defence of the Practice Report and by the feedback from the training company. The Faculty has established the examination, reports assessment and tests system and respective rules to assess the learning outcomes (well introduced in the ORTUS e-learning platform) described in the documents “Regulation on the Assessment of Learning Outcomes”, “RTU Quality Policy”. Extra-curricular or non-formal or previous experiences are taken into account following the procedures defined in “Procedure for Recognition of Competencies Developed Outside Formal Education”. Experts were satisfied with the prepared documents and interviews with the students and teachers and assured that the student assessment system works well.

Procedures for the admission and examinations are sufficiently described in the presented Self Evaluation Report and interviews with the teachers and students confirmed the common understanding of these procedures. The documents defining the admission and examinations procedures in detail are “Regulation on the Assessment of Learning Outcomes”, “Regulation on Final Examinations at RTU”, “On Admission and Training of Foreign Students”, “Admission Regulations for Academic and Professional Undergraduate Study Programs in Academic Year 2021_2022”, “Admission Regulations for Academic and Professional Undergraduate Study Programs in Academic Year 2022_2023”, “Admission Regulations for Academic and Professional Graduate Study Programs in Academic Year 2020_2021”, “Admission Requirements for Doctoral Study Programs in Academic Year 2020_2021”, which are following the Latvian Cabinet Regulations No. 846 “Regulations on Requirements, Criteria and Procedures for Admission to Study Programs”. The admission is organised on the competition basis considering the average evaluation of the certificate / diploma transcript, the centralised exam of the general secondary or BSc level graduation diploma for respective level programme admission. Considering not the highest number of applicants and high drop-out rate the procedure seems to be reasonable but mathematics and physics marks very low entrance threshold seems correlating with the high drop-out rate on first years on the bachelor level, which in ones turn generates lot of additional teaching resources spending on these years without the results i.e. these expelled very weak students are not graduating. Therefore the selection procedures of the potential students needs improvement in the sense of selecting highly motivated and better prepared students to reduce the drop-out rate. It was the experts opinion that the process could be improved hand in hand with involving more employers, more practical activities based classes into the study programmes and introducing more project and perspective research based and innovative courses as well as increasing the international collaboration and students exchange making the study programmes more attractive.

he information published on the RTU websites is comprehensive and detailed enough for the respective Study Field and potential new students and it is in the language of the study programme, i.e. in Latvian and in English (<https://www.rtu.lv/>). The information in the website complies with the information in the official registers.

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

RTU and Faculty have introduced the Quality Management Policy and respective quality assurance system, which is an essential step for the study programmes continuous improvement. The feedback mechanisms and respective analysis tools and study programme improvement procedures are defined and the teaching staff is aware of and follows the procedures. Therefore it should be concluded that the Faculty staff is aware and capable to improve the Study Field programmes and to react to the changes of the industry needs, which creates great potential for improvements. The experts noted that RTU and Faculty have integrated standards and guidelines of Part 1 of the ESG for internal quality assurance in the study process and has determined aims and measures, which are integrated in a joint quality assurance system in order to improve the performance of the relevant study programmes of the Study Field and the Faculty and all Heads of the Study programmes are taking relevant steps to achieve this goal.

Strengths:

1. Staff awareness of the quality management importance and introduced EFQM procedures for the study programme improvements.
2. Existing feedback collecting system and procedures for the analysis of the feedback.
3. Students awareness about the quality management system.

Weaknesses:

1. Relatively weak involvement of the graduates and employers in the quality management system.
2. Unclearly defined measures and KPI-s and relevant actions needed assessing the implementation and effect of the quality system into the improvement of the Study Field programmes.

Assessment of the requirement [1]

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

Assessment of compliance: Fully compliant

The University introduced the Quality Management Policy and respective quality assurance system and the detailed regulations for the Study Field, which is an essential step for the study programmes continuous improvement.

- 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 as result of higher managerial organization and structure has established a policy and procedures for assuring the quality of higher education in the University documents (f.e. "RTU Quality Policy", "Code of Academic Integrity", "Analysis of the breach of academic integrity", "Statement of the Breach of Academic Integrity by a Student") and practical activities.

- 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

RTU has developed the mechanisms for the development and internal approval of the study programmes, the supervision of their performance and periodic inspection is realized constantly.

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

Assessment of compliance: Fully compliant

The development, implementation and publishing of the criteria, conditions and procedures for the evaluation of students' results are on the highest level.

- 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

All internal documents, procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.

- 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

The feedback mechanisms and respective analysis tools of the study achievements of all stakeholders are established and study programme improvement procedures are defined and the teaching staff is aware of and follows the procedures.

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

Assessment of compliance: Fully compliant

RTU ensures continuous improvement, development, and efficient performance of the study field whilst implementing its quality assurance systems.

1.3. Resources and Provision of the Study Field

Analysis

A three-pillar funding model has been introduced. 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. Base funding is determined on the basis of the number of study seats determined by the state at RTU.

Each organizational unit is allocated a separate budget. The new Methodology² (Minutes of the meeting of RTU Senate of 28 June 2021 (Minutes No 651) On Approval of the Methodology for Allocation and Application of Funds to RTU Units in Academic Year 2021/2022) provides funding for the structural unit responsible for the implementation of the study program for its development.

Funding of the study field "Mechanics and Metal Working, Heat Power, Heat Engineering and Mechanical Engineering" is stable and has a growing tendency.

Performance funding (research support funding) is allocated as a monthly limit.

Research base funding (provided by the state) is allocated among faculties according to the performance-based output indicators.

The study program financing also consists of tuition fee revenue from the resources of natural or legal persons, which can be divided into two subgroups: 1. revenue from local fee-paying students; 2. revenue from foreign fee-paying students.

The infrastructure of Kipsala Campus provides students, staff and guests with all the necessary services and utilities. The occupied useful area of the FMETA building is 4365.9 m² with five floors, comprising lecture rooms and rooms for academic staff, meeting halls, and different laboratories.

Funds for the purchase of study or scientific literature are available for each study program. The Library Council has approved the Compilation Policy of RTU SL Collection,

The laboratories are well equipped. There is good cooperation established with the private sector ensuring that the latest equipment is installed (Mitutoyo measurement lab, welding lab, Bosch car diagnostics lab and others).

RTU Scientific Library (SL) plays an important role in the provision of methodological guides and educational resources to students. A Library Council has been established, which decides on replenishing the library collection. SL calculates funding for the information resources for each study programme. For the study field in question 736 new books were purchased by the SL amounting to 44759.88 EUR in the period of 2013 – 2020.

The Information Technology Department of RTU provides administrative and academic staff with modern, reliable, secure and unified IT infrastructure and quality IT services. All IT users are provided access to the centralised portal ORTUS. Moodle e-learning system is available for everybody. For online distance learning RTU academic staff has options to use Zoom or Microsoft Teams video conferencing platforms.

Students have access to top level software that they can install also on their personal computers at home to work on study projects and strengthen the learning process.

At the end of 2018, the Centre for Academic Excellence (teaching and learning Centre) was established at RTU in order to support RTU academic staff.

Each semester a core set of activities is offered taking into account the professional competence and needs of the academic staff.

Elections of RTU academic staff are held in accordance with the requirements of relevant enactments at State and RTU level. The evaluation is performed by the Board of professors of the field. The Personnel Department announces a competition for academic staff positions.

The Centre for Academic Excellence was established at RTU in order to support RTU academic staff in the areas of pedagogical, intercultural communication and self-development. The Centre organises two methodological conferences a year.

Needs of the academic staff are identified through a survey, in which the lecturers indicate the most important topics and areas in which they want to improve themselves.

Lecturers have the opportunity to improve their English language skills by applying to the relevant courses.

After each professional development event, participants complete assessment questionnaires, which enable organizers to improve the range of offered events. In order to promote the development of competences of the academic staff, the student surveys are analyzed each semester.

From 2007, the FMETA created the FMETA badge of honour “ZELTA ZOBRATS”, awarded for staff

members long-term (20-25 years) and honourable work at the Faculty and contribution to the Faculty development.

All elected academics have both academic and research and, in some cases, administrative work the proportion of which is determined individually for each academic staff representative.

RTU Career Support and Services Department provides students with a wide range of career and psychological support services like career development support, psychological support by seminars and workshops. Foreign student's individual and career support consultations are available in English.

Recommendations were issued for effective communication and improvement of the study environment for people with disabilities and special needs.

RTU International Cooperation and Foreign Students Department has academic consultants who consult foreign students on studies and practical issues, including facilitation of the immigration process.

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

RTU has set all necessary conditions for implementation of programmes of the study field.

Strengths:

1. Facilities in new buildings.
2. Some outstanding high level laboratories (Metrology lab, Nano Engineering lab and Clean Room, Materials testing lab equipment, etc).
3. Relatively good level library supporting the Study Field.
4. Compactness of the Campus and Faculty rooms.
5. Financial support of doctoral students (Guidelines on Allocation of the Scholarship Equalized to RTU Doctoral Student Loan (approved by Vice-Rector for Research on 9 September 2013))

Weaknesses:

1. Few state funding for new laboratories equipment.
2. The state funding for the Study Field is changing year by year and no long term stability.

1.4. Scientific Research and Artistic Creation

Analysis

The research activities of the institution were accredited last year as part of the national research assessment exercise (every 6 years). This evaluation process highlighted two areas for improvement concerning renewal/refresh of research areas and laboratories including staff. In response, RTU has implemented a tenure track professorship programme to attract leading academics alongside a rolling programme of partnerships with industry to co-fund laboratory and equipment. To date two tenure track professors have been recruited and financial donations from industry were 500k Euros last year.

The institution works closely with local and international companies (100+) and this, combined with the government priorities, has helped shape the current roadmap/plan for research areas/activities including six research platforms within the Faculty. These platforms are: "Energy and Environment",

“Cities and Development”, “Information and Communication Technologies”, “Transport”, “Materials, Processes and Technologies”, and “Security and Defence”.

Each year there are three competitive internal calls aimed at i) supporting publication activities of young scientists; ii) interdisciplinary research within six research platforms of RTU; and, iii) involving graduates in the research process. Total funding for the largest call (2) is ~120k Euros total and is competitive with around 6 projects funded per year.

The scientific strengths of the institution reflect the needs of local industry and national priorities as well as contemporary topics on the international research landscape. This has given rise to a blend of applied and more fundamental scientific activities. The Faculty has an ongoing programme of laboratory refurbishment. Recent refurbishments include the fluids laboratory sponsored by SMC and the Mitutoyo metrology lab. The refurbished laboratories provide excellent facilities. The research activities of the institution were accredited last year as part of the national research assessment exercise (every 6 years). This evaluation process highlighted two areas for improvement concerning renewal/refresh of research areas and laboratories including staff. In response, RTU has implemented a tenure track professorship programme to attract leading academics alongside a rolling programme of partnerships with industry to co-fund laboratory and equipment. To date two tenure track professors have been recruited and financial donations from industry were 500k Euros last year.

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Many student projects are aligned with industry partners/needs enabling students to work on real world challenges and helping to build links with industry. While the applied nature of these is of benefit to students and industry, care needs to be taken to ensure that the portfolio of projects supports scientific activities also. The HEI might explicitly acknowledge students in scientific papers via, for example, an acknowledgements section. In this way, evidence can be curated of the link between study processes and scientific research.

A new course covering product innovation and entrepreneurship was introduced in 2016/2017. In 2018, following a successful trial, this course was made compulsory for all students in the Faculty. This course is complemented by the innovation activities of the Design Factory which includes an optional (extra-curricular) Vertically Integrated Project and business incubator support. The former provides interdisciplinary challenge-based projects set by industry while the latter supports entrepreneurial activities for both students and staff.

All new / refurbished laboratories are providing specialized modules that are available to all students in the Faculty for both Bachelors and Masters levels. Overall the quality of laboratories is satisfactory to excellent. Some laboratories appear very well equipped with the latest industry standard and

state-of-the art equipment e.g., fluids laboratory and SMC, the Mitutoyo metrology lab (100% sponsored by industry) and the automotive testing lab sponsored by Bosch, while others less so e.g. Industrial Design. The university has also invested in the Design Factory which could provide support for the industrial design programme and laboratory, but is open to the entire university, not just the Faculty.

It was evident from the tour of the facilities and discussions with the heads of laboratories that students at all levels are involved in scientific/applied research. However, evidence of the output of the work undertaken was limited e.g. posters on the walls and / or prototypes from previous projects.

Academic collaborations in the Baltic region and across Europe are significant and growing. A substantial (25) portfolio of large projects are listed on pages 73 and 74 of the self-assessment report with a number finishing in 2021 and 2022. No details of the pipeline (submitted bids are given). While evidence of collaboration is strong, including Erasmus programmes, specific mechanisms to develop and maintain international collaborations and secure ongoing funding (EU) are not developed and described. The panel noted that the institution has implemented many local initiatives to develop new areas but none of these appear to be focussed explicitly on international cooperation.

In addition to the academic partnerships, the institution is developing long-term relationships with major national and international organisations (Bosch, Mitutoyo) which includes extensive equipment and resource sharing benefiting both students and staff in teaching and research.

The higher education institution/ college has developed mechanisms for the involvement of the teaching staff in scientific research and/or applied research and/or artistic creation. They are well-functioning and efficient.

In June 2021, RTU Senate approved RTU Regulation “On the Procedure for Electing a Professor or an Associate Professor and the Procedure for Evaluating the Qualification of the Elected Professor or Associate Professor. These regulations provide a critical foundation for managing performance and setting expectations and aspirations. The regulation give specific attention to high quality international publications. A further initiative is the Internal Research Excellence Grant for young scientists aimed at attracting talented young researchers to RTU and providing them with funding, which allows establishing new research groups in a prospective research field. Funding for a 3-year period is based on international competition under conditions similar to EC ERC grant, and international call and evaluation performed by external, i.e., foreign well-recognized researchers. Evidence is provided of a substantial increase in scientific publications (SCOPUS) since the last accreditation. Publication rates are now at an average of 1.5 publications per FTE per year.

A number of initiatives have been implemented to target the recruitment and support of doctoral researchers. As a direct consequence of this, and since 2016, there are 88 FTE (PhD students) and 97 FTE (Post-doctoral researchers). These appear to correspond well to the increase in publication rates. Competition rates of doctoral researchers can vary substantially with many taking 5 years and extended career breaks during their studies. While monitoring procedures for progress have been implemented, doctoral researchers must be given sufficient time to perform their research. Interviews with doctoral candidates revealed that many perform a large number of teaching hours and receive extensive training courses in their first year which can all but prevent them undertaking research in their first year. The financial viability of proving courses to very low numbers of doctoral students should also be considered.

Bachelor and Masters students undertake their projects/final papers within the four scientific institutes using the facilities and working alongside the Doctoral students. As noted previously, the Faculty should consider explicitly acknowledging and reporting student contributions to scientific

publications.

While not necessarily scientifically led, students have access to and are encouraged to participate in the opportunities provided by the Design Factory. Of the students interviewed during accreditation, relatively few were aware of or had used the Design Factory. The Faculty should increase communications about the DF and opportunities to exploit the DF within programmes e.g. Industrial Design.

Observed/evidenced innovations that positively impact the study process include:

- Industrial partnerships provide industry standard and state-of-the-art facilities for the laboratories at little to no cost. The laboratories also provide training for industry which again ensures that curriculum is updated and industry-driven.
- Design Factory provides opportunities for all students to develop transferable, soft and entrepreneurial skills.
- Many students are involved in/contribute to scientific research and ultimately publications. More effort should be given to capturing and reporting this.
- The number of doctoral students has reduced substantially in the last two years, likely impacted by the pandemic and completion of a number of large projects. Efforts will need to be made to increase the number of new doctoral students. Three doctoral programmes are being prepared in English and this should help recruit international students.

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

Based on the evidence submitted for the accreditation period, the institution is tending toward being fully compliant. The research culture is very positive and becoming more forward thinking - driven by a range of institutional initiatives covering research strategy and investment in infrastructure. Publication rates are at 1.5/year/FTE with the potential to increase over the forthcoming years. Challenges of staff time and falling number of doctoral students will need to be addressed in the next period.

Strengths:

1. A range of initiatives and good practices have been implemented from laboratory refurbishments to job/promotion guidelines, entrepreneurial activities and a range of internal funding mechanisms/calls.
2. Launch of doctoral programmes in English.
3. Industry partnerships and co-funded laboratories.

Weaknesses:

1. Attention needs to be given to falling numbers and low completion rates for doctoral programmes.
2. The Faculty needs to drive for efficiency ensuring that staff and students alike have sufficient time for scientific activities and that inefficient (financially unviable) units/courses are rethought to give back time and increase quality and relevance for students.
3. Lack of specific mechanisms to build and maintain regional and wider EU collaborations.
4. Lack of acknowledgement and traceability of student contribution to academic publications.
5. Lack of student work displayed in the laboratories.

Assessment of the requirement [2]

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

Assessment of compliance: Fully compliant

Good publication rates, well-developed scientific and applied research strategy and ongoing programme of investment.

1.5. Cooperation and Internationalisation

Analysis

The higher education institution/ college cooperates with the institutions from Latvia (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the framework of the study field, and such cooperation contributes to the achievement of the aims and learning outcomes of the study field and the relevant study programmes. The cooperation partners are selected in view of the specific features of the study field and the relevant study programmes.

The study field cooperates with a broad spectrum of institutions in Latvia, including HEI, employers, employer's organisations, scientific institutes and others. RTU has provided a long list of different national cooperation partners relevant to the Study Field under review. Association of Mechanical Engineering and Metalworking Industries of Latvia, Latvian Electrical Engineering and Electronics Industry Association and Latvian Association of Heat Companies, including the companies within these associations are among principal cooperation partners of the Study Field. The total number exceeds 190. The main criteria for selecting appropriate partners for study programmes include the field of scientific and professional activity of partners, reputation, and experience of previous cooperation. It has been shown that the cooperation with national institutions aims to improve the study process and its quality by provision of professional development of students, offering them internship places and jobs as well as involving the company specialists in the study process.

The higher education institution/ college cooperates with the institutions from abroad (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the framework of the study field, and such cooperation contributes to the achievement of the aims and learning outcomes of the study field and the relevant study programmes. The cooperation partners are selected in view of the specific features of the study field and the relevant study programmes.

The Study Field has shown that the choice of cooperation partners is based on the previous experience of the study direction and cooperation of experts with foreign institutions in studies, science, project development, membership in associations and other forms. The documents provided by the Study Field show that most of the cooperation partners are HEI with Erasmus+ agreements; some teaching staff representatives are actively collaborating with foreign scientific institutions, which is proved by teaching and scientific staff mobilities as well as organisation of common events like international summer school "Nonlinear Life" in the field of biomedical engineering. Nevertheless, the average scientific collaboration intensity and numbers (e.g. number of common papers) in the Study Field could be higher. Numbers of local students participating in the ERASMUS programme could also be higher although the panel are aware that many students hold part time jobs making international exchanges challenging.

The higher education institution/ college has developed a system and procedures for the attraction of the teaching staff and students from abroad within the study field, the system is effective. Teaching staff and students participate in both outgoing and incoming mobility, which provides added value to the implementation of the study process and the quality of studies.

The self-assessment document reveals that RTU has developed a system and procedures for the attraction of teaching staff and students from abroad. Two communication target groups are mainly

addressed: the internal (management team; general staff, academic staff; existing students) and the external (prospective foreign students (foreign students studying in Latvia, foreign pupils and students, parents of foreign pupils and students); foreign graduates; mass media; opinion leaders; educational institutions; student recruitment education agencies). The communication strategy uses several types of information channels, choosing the most appropriate for each target audience – paid advertising channels, earned and owned ones. The main marketing tool used to reach foreign audiences is participation in various educational exhibitions and seminars organised by educational agencies in target markets.

The system seems to be effective although the COVID-19 situation in the middle of the period under analysis has impacted the statistics. The number of incoming students (both full-time and Erasmus+) has been constantly growing until the Year 2017/2018; since then it has been declining mainly due to COVID-19 restrictions. The outgoing mobility of students is quite low except for Engineering Technology, Mechanics and Mechanical engineering Masters program that stands out with a total number of 46 students while some of the programmes have none. The outgoing mobility of students and faculty members needs to be further stimulated and strengthened.

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

The overall analysis shows that RTU has developed a strong and effective network of collaborators (HEI, companies and public institutions). The intensity of scientific collaboration with foreign institutions needs to be increased. The number of international students has been growing during the reporting period and is foreseen to become even higher. The outgoing mobility of teaching staff and students needs to be further stimulated and enhanced.

Strengths:

1. A strong network of national, local, and international collaborations has been established.
2. The number of international students is growing and appears to be facilitated by an increasing number of courses/units being delivered in English.

Weaknesses:

1. The outgoing mobility of both students and teaching staff needs to be increased.
2. International scientific collaboration needs to be enhanced.
3. Number of guest lecturers could be improved.

Assessment of the requirement [3]

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

Assessment of compliance: Fully compliant

The good and broad framework of RTU cooperation with other Latvian and foreign organizations, scientific institutions and higher education institutions in the study field implementation and research activities provide very positive field for students for achieving learning and research outcomes.

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

Analysis

The accreditations of the RTU taught courses have been performed previously by the Accreditation

Commission (ref: 2.2.1), conducted at various times between May 2012 and the current time. The initial evaluation was performed by the Accreditation Commission, submitted on May 12, 2012 for the 23 programs of field study.

Study Programme Aviation Transport (425255) provides evidence of the accreditation certificate for the field study issued in 2013 (ref 3.1.1), which is satisfactory. Furthermore, the Aviation Transport programme cites submission and the award of the Part 147 EASA approved training school, issued by the Civil Aviation Agency (CAA) of Republic of Latvia.

Further evidence of accreditation is provided by the Aviation Transport study programme (ref: 3.2.1). The CAA is- "After certification, on September 8, 2014, the CAA approval certificate of the Republic of Latvia was issued to LV. 147. 0003 that RTU MTAf AERTI is a maintenance training organisation (TAMO) in accordance with Regulation (EU) No 182/2011. Section A of Annex IV (Part-147) to Regulation (EU) No 1321/2014 confirming that AERTI provides training and examination for the issue of the relevant recognition certificate."

Lastly, the requirements of EASA and the CAA require the regular conduct of external quality assurance audits to ensure continued accreditation and compliance with EU law. This achievement for this programme demonstrates the European standard of the accreditation, and more importantly, the continued compliance with the legal standards. Having this Part 147 accreditation is a significant achievement for any European organisation and demonstrates the levels of commitment of both standards and financial stability to support the educational programme(s).

The programmes are considered to be fully compliant with the accreditation processes and procedures referenced in the submitted documentation.

References:

2.2.1 Study Direction Committees at RTU supervise academic activities in the respective study direction and are responsible for curriculum of the study programmes within the study direction, including accreditation of the study direction. Members of student self-government are involved in ensuring the quality of the study direction and study programmes implemented therein; they actively participate in the work of the decision-making bodies of the University: RTU Constitutional Assembly, RTU Senate, RTU Senate commissions and faculty councils.

2.6.1 Previous accreditations of field studies, conducted by the Accreditation Commission, submitted on May 12, 2012 for the 23 programs of field study

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

"The study quality commission meeting on 27 July 2020 decided on the "Railway Engineering" program of the professional bachelor of Riga Technical University. Meeting of 19 August 2020: decision on the licensing of the "Railway Engineering" professional masters' program."

The recommendations provided are fully implemented. The contribution of the higher education institution / Faculty to the analysis of recommendations and their application to the specifics of the study field and the corresponding study programmes is evident. For example, recommendations made by the Latvian CAA with regard to the conduct of approved basic maintenance training has been implemented, and the evidence of these actions are the continuous award and licensing of the RTU Part 147 EASA approval.

While recommendations have been fully implemented and evidence is provided of new processes,

mechanisms and support to address the recommendations, the claimed impact of some of these has been limited. These include: international exchanges for students and staff; involvement and influence of employers and alumni in programme reviews and continuous improvement; and training and support (including a yearly appraisal/review cycle). These areas have also been identified in this accreditation as requiring further attention across all study programmes. The panel noted that some study programmes perform relatively well in regard to international exchanges and alignment of scientific activities and dissertations.

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

The recommendations of the previous assessment procedure in 2012 have been implemented. Previous assessment was performed for the 23 programmes of the Field of Study and the current assessment is being performed for the 20 programmes. In addition to the reduction of the number of the programmes most of the programmes had some significant changes to update the technical content of the topics or completely new programmes were introduced and to increase the compactness of the programmes.

The strengths identified are the corrections of previous shortcomings for the respective programmes.

A minor weakness are certain programmes not having a larger student mobility uptake in the ERASMUS+ schemes, but with the recent effects regarding the COVID 19 pandemic, it would be hoped that the student mobility could be further encouraged and expanded.

Assessment of the requirement [4]

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

Assessment of compliance: Fully compliant

The previous shortcomings of the field study and implementations of the previous assessment report recommendations that were provided have been well addressed. No significant shortcomings are identified.

1.7. Recommendations for the Study Field

Short-term recommendations

Increase the intake threshold for the first year students (implementation 1 year).

Involve the employers and graduates in the Study Programmes promotional activities (implementation 1 year).

Introduce at least one practical and attractive project to each programme for every study year (implementation 2 years).

Introduce more English language courses foreign and local students can study together (implementation 2 years).

Develop an action plan for combining and introducing environment engineering, entrepreneurship and a technical course into one practical course or project in each programme (implementation 1-2 years depending on the programme).

Long-term recommendations

Introduce long term financial planning scheme for the programmes (implementation 2-3 years).
Set more detailed plan to reduce the average age of the teachers (implementation 2-5 years depending on the programme).
Set the definite plan to reduce the teaching load for the academic staff (implementation 2-5 years depending on the programme).
Introduce a career development scheme for young academic staff and doctoral students (implementation 3 years).
Introduce cross Faculty bigger teaching courses to optimise the teaching resources expenditure (implementation 3-5 years).

II - "Mechanical and Instrumental Engineering" ASSESSMENT

II - "Mechanical and Instrumental Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Programme ensures understanding of the essential concepts and regularities of the Mechanical Engineering and Mechanics industry. Graduates skills and competencies are entirely in line with the industry requirements set out in the relevant professional standard. The content of the professional study programme is developed and updated in accordance with Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education". The study program "Mechanical and Instrumental Engineering" is the 6th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF) study programme. The study programme is the only one in Latvia.

2.1.2.

According to the study program's title, aim and tasks, the study results are also formulated as all skills and competencies required for a Bachelor's degree in Mechanical and Instrumental Engineering. These skills and competencies are entirely in line with the industry requirements set out in the relevant professional standard. The study program is implemented full-time (4 years) and part-time (5 years) in the Latvian language (160 CP).

Programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme.

The programme was last updated in 2021, the content of the study courses was reviewed and analyzed. At the MMI meeting on 19.08.21. protocol No. 25604-2 / 4 a decision was made to make changes to the study program "Mechanical and Instrumental Engineering" to improve the quality and competitiveness of the program.

2.1.3.

Major changes were made in the study program according to the "Riga Technical University Uniform Requirements for Academic and Professional Study Programs" (Protocol No. 588 of the Senate Decision of 23.03.2015). Three Professional specializations and 5 related courses were canceled.

Some courses were replaced. As noted above, in 2021, a number of changes were made including the courses: IDA700 Basics of Labor Protection 1 CP was replaced by VAS038 Environmental and Climate Guide 1CP in section A. Section A was supplemented with current study courses: MAB267 Basis of the Automated Design - SolidWorks 2CP, MAT123 LEAN production technology 2 CP. The volume of credit points for Part D of the study program has been changed from 26 CP to 24 CP. The existing internship study courses were replaced with the study course MMM010 "Designer " [20 CP].

2.1.4.

Annual mechanical industry research shows that 70% of companies identify the lack of qualified professionals as a significant impediment to development. Industry currently needs approximately 150-220 additional mechanics engineers.

The total number of students decreases slightly. Around 30% students indicate that it is not possible to complete their studies on time due to workload due to their financial situation. This is also a problem not to allow to go to abroad with the help of ERASMUS+ programme.

The department are visiting schools and recruitment events to increase the intake for 2022 and beyond. Such outreach and recruitment activities could also been performed in conjunction with the Alumni / industry.

A number of the staff work part time in industry and these links are used in combination with lectures from past graduates. When interviewed, students stated that they enjoyed the guest lectures and would like additional ones, particularly from entrepreneurs and start-ups in the area.

There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review also considers professional standards.

2.1.5. Not applicable

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

Overall the programme is well designed and has been improved and updated to meet new national standards. The process of updating the programme is ongoing. There are two interrelated areas for longer-term consideration. These concern the programme promotion among the high-school students to attract better students and tighten the collaboration with the companies for wider involvement of the industry people in further development of the programme and delivering guest lectures.

Strengths:

1. Strong relations with the industry and local business.
2. Continuous improvement of programme content.

Weaknesses:

1. No clear initiatives of international benchmarking have been found in order to monitor own progress and to focus the development of the study programme.
2. Number of students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities is very low.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout

the programme. The programme was updated in 2021. In order for the content of the study program to comply with the requirements of the State Standards of Higher Education of the Republic of Latvia, major changes were made. CP-s were shifted between program parts, some courses replaced. Graduates skills and competencies are entirely in line with the industry requirements set out in the relevant standard (Mechanical Engineer Professional Standard).

None of the students interviewed had been involved in any international exchanges. The main reason/barrier was cited as holding a part time job.

Employers praised graduates from RTU concluding that they bring knowledge and expertise that are relevant to the local needs and optimisation of the legacy and new systems. Employers provide opportunities for excursions and fully support the institution in this regard.

2.2.2. Not applicable

2.2.3.

Programme includes a range of practical/lab work within the courses. During the accreditation visit staff stated that close to 20% was the target for the amount of practical work. Students felt that the first year was very theoretical and that the high mathematics content can contribute to many students losing motivation and ultimately leaving the programme.

The SP report states that student centric learning is implemented in a number of specific units but the specific details of 'what' and 'how' are not fully reported.

A small number choose to study part-time (distance learning).

2.2.4. The study program also envisages a compulsory internship (24 CP), which is conducted in an employer company - in accordance with Cabinet Regulation No. 51 of 26th August 2014.

The issues of internship management are formulated in the regulations. 3-sided agreements are closed with RTU, the company, and the student for the internship. Students are required to maintain a diary of their internship logging the experience, training and work done. A range of internships are made available to students but students can find their own if they wish. Interviews with the students during accreditation revealed that some students felt that a single internship can limit opportunities and that a number of shorter internships at a couple of organizations operating in different areas would be beneficial.

2.2.5. Not applicable

2.2.6.

The aim of the Bachelor's thesis is to develop and compile a project solving an actual tasks in a mechanical and metalworking industry in cooperation with the company. Most students are admitted to practice and start their work before graduation and proposals for Bachelor's theses come from industry.

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

The programme has been updated recently and is already broad and compliant to respective requirements. It is clear that a balance needs to be sought between programme content that supports general mechanical engineering and from the other hand instrument engineering and that links to the future addressing tighter merging ICT and traditional mechanical engineering in future instrument engineering.

Strengths:

1. Strong industrial links and input from industry.

Weaknesses:

1. Few, if any, students and staff have been involved in international exchanges.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The programme is mainly implemented in training laboratories, such as Metrology Training Laboratory, Automation Training Laboratory, Materials Technology Training Laboratory. However, some classes also occur in scientific laboratories, such as the Welding Laboratory and Mitutoyo Laboratories. Where necessary, students work in computer classrooms.

The RTU library is regularly updated.

The University staff reported that there was an ambition to develop the programmes including digitalisation of the study provision, which is considered to be positive.

However, some of the students commented that access to digital resources in the library was limited and not meeting their expectation, extending from the print media to the digital access of journals and periodic searching/ viewing. The implementations of these resources for the study programme are identified as an area for improvement, by both the students, the staff etc.

The staff did comment that they have received update training in recent years, and has included newer and relevant CAD software training, which is considered to be very supportive.

However, the students commented that they sometimes found it difficult to access the software to conduct these activities/ assignments. The communal cluster PC with the correct software were limited, and were forced to use their own machines and attempt to obtain software by other means (trial software/ copy software/ fake software).

The practical laboratory facilities observed are considered fully appropriate and in line with the engineering study programme.

2.3.2. Not applicable

2.3.3.

The study programme is implemented at the expense of the state budget. Number of students comply with requirements for minimum number in programme.

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

The resources assigned to the study provision as a whole are generally in-line with the ambition of the taught degree. The laboratory facilities are considered a significant asset and achievement and support the study programmes accordingly. The practical laboratory facilities observed are considered fully appropriate and in line with the engineering study programme. Many laboratories such as Metrology Laboratory, Materials Technology Laboratory and others have equipment the department got as a gift from the companies or bought reduced prices from a project resources.

However, some of the resources assigned to support the implementation of the study programme is identified as a shortcoming especially these that would support independent and practical project

work and sensor techniques

Strengths:

1. Significant and ongoing development has been made in laboratories.

Weaknesses:

1. Resources and access to resources appear limited.
2. Greater resources should be provided for future automation/instrumentation technologies/approaches.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme`s resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

Study courses in the study program are implemented by the teaching staff of the Department of Mechanical Engineering and Mechatronics (MMK), RTU Daugavpils Study and Science Center (DSSC) and RTU Liepāja Study and Science Center (LSSC). There are 17 Dr.Sc.ing. and 9 Mg. Sc.ing. Staff attested to a good range of training courses provided by the institution and excellent support from colleagues. In addition, RTU has implemented a good training programme including seminars and training in specific areas. According to the self-evaluation report (pg 72), RTU has implemented a new procedure and guidance on promotion criteria. However, of the staff interviewed many were unaware of this.

2.4.2.

Staff felt that they have a lot of influence over the content and that because the regular meetings provide the opportunity to discuss and review the changes. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review considers professional standards. During the reporting period five professors of the last academic team terminated their educational activities. The average age of the academic staff decreased due to the defense of several scientific dissertations in the field, assistant professors have moved to the category of associate professors. Teaching staff had the opportunity to improve their English language skills and train in various companies.

2.4.3. Not applicable

2.4.4.

During the assesment visit it was stated that the Department aims for all staff to publish 2-4 articles a year and are looking to do more particularly with a younger composition of academic staff. Each member of the teaching staff has published in peer-reviewed editions or have more than five years

of practical experience. Although not analysed for the specific staff members, the above values appear consistent with the overall number of publications in the period. The institution and faculty provide training and signposting for conferences. This was considered helpful but staff have limited time to attend conferences due to their very high portfolio of activities.

2.4.5.

One of the cooperation mechanisms is the implementation of study projects within the framework of several successively implemented study courses. Meetings of the structural units are organized at least once a week. Here is one lecturer and 10 to 15 students. It provides a student-centered approach in teaching. Joint supervising of the final year projects and periodic meetings demonstrates strong collaboration and team working of the academic staff.

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

An enthusiastic and close team with a good mix of scientific and industrial experience. Staff is active in research and providing industrial training courses, active and keen to continuously develop the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. Indications of young academic staff growth.
2. Active and specialty enthusiastic staff.

Weaknesses:

1. Senior staff are rapidly approaching retirement.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. The collaboration mechanisms between the academic staff members are in place. In general, ensured all conditions for the implementation of the study programme.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education".

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Mechanical engineer, approved on 09.02.2022. <https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-209.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments.

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

Overall the programme is well designed and have been improved and updated to meet the national standards. The process of updating the programme is ongoing. Underlying all the assessment areas are two interrelated areas: mechanical engineering and instrument engineering. The first concerns the basic mechanical engineering knowledge and skills. The second concerns the balance between the traditional mechanical engineering and fast developing instrumentation trends incl. increase of ICT role in instrument techniques.

Strengths:

1. Young staff growth is noticeable.
2. Ongoing and successful process of laboratory refurbishment and 'updating.

3. Good collaboration with industry.

Weaknesses:

1. Relatively few courses delivered in English / reliance on the ME department to deliver units in English.
2. Few, if any, students and staff have been involved in international exchanges.

Evaluation of the study programme "Mechanical and Instrumental Engineering"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Mechanical and Instrumental Engineering"

Short-term recommendations

Increase the number of students participation in international mobility (eg. ERASMUS+, bilateral, etc.).

Long-term recommendations

Develop initiatives of international benchmarking and to focus the development of the study programme.

II - "Mechatronics" ASSESSMENT

II - "Mechatronics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The content of the professional study programme "Mechatronics" is developed and updated in accordance with Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education". The study program "Mechatronics" is the 6th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF) study programme. Programme ensures understanding of the essential concepts and regularities of the Mechatronics. Graduates skills and competencies are entirely in line with the industry requirements set out in the relevant professional standard "Mechatronics Engineer" and the graduates receive the professional bachelor degree in mechatronics and the qualification of a mechatronics engineer. The study programme is the only one in Latvia. Study programme fully complies with the study field and professional standard. Implementing of the programme is organized in collaboration with other RTU departments to cover all the mechatronics three main aspects: mechanical engineering, ICT and electronics.

2.1.2.

The programme is 4 years full time duration Latvian language and 160 CP. Programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Professional qualification of the study programme, aims, objectives, learning outcomes fit the

requirements of Latvian State education standard (No 2144 38).

<https://www.lm.gov.lv/lv/klasifikacija/profesiju-klasifikators/profesiju-klasifikators-aktualizets-2022gada-8aprili?search=mehatronikas%20in%C5%BEEneri>.

The duration and scope of the study programme is relevant to the mechatronics engineer's tasks and duties in companies, dealing with process automation all of which are defined in the respective professional standard. All the aspects of the professional mechatronics engineer duties are discussed in the Mechatronics programme respective study courses. The learning outcomes of the programme assure achieving the aims set and prove the compliance of the programme to the professional standard.

The admission requirement is to have completed general or vocational secondary education.

Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme.

The programme was last updated in 2021 to comply with the professional standard and assure the quality of the programme.

2.1.3.

The programme relevance is continuously monitored and assessed by the RTU administration as well as discussed with the industry representatives and respective corrections were introduced in 2014, 2017 and 2021. The programme latest changes and corrections were introduced only in 2021 when the content of the study courses was reviewed and analyzed in order to improve the quality and competitiveness of the study program. The following changes were introduced by the decision of the council of the Institute of Mechanics and Mechanical Engineering 08.09.21. No. 25500-2 / 4. The total amount of the study program has been changed from 180 to 160 CP. The total duration of the studies has been changed to change the duration of studies from 4.5 years to 4 years. The programme Part A was changed from 116 CP to 90 CP, and Part B1 was changed from 9 CP to 24 CP. Part B2 humanities and social studies courses were clarified and improved and the volume of Part D of the study program has been changed from 26 CP to 20 CP where the study course MMM010 "Designer Practice" [20 CP] was introduced. The implementation of the changes was facilitated by considering the quality assurance of the study programme.

2.1.4.

There is high demand for mechatronics engineers in the industry proven. The enrollment rate, i.e., public interest is high enough, but due to high dropout rate the graduates number is too small (annex MCEO_stud_stat LV_EN.pdf or SAR p.106). Only roughly 20-25 % of the entrants graduate in time as indicated in SAR and this should be considered relatively low percentage and needs improvement.

Program director specifies the reason for high dropout rate as the students work in companies to get money to live and also the problem is connected with the Mathematics and Physics courses on the first year, which are very theoretical and hard to acquire when students are in beginning of their independent studies quite different from the high school courses. Almost all students are forced to work from the 2nd year due to their financial situation. Students interviewed during the visit were very enthusiastic and seem keen on the specialty.

2.1.5. Not applicable

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

High demand of mechatronics students by local industry mentioned in the Self-Evaluation Report and also proven on the interviews of employers and students is an evidence the programme is on right

track. High enrollment rate and many changes of the programme during the assessment period to improve the quality show the high potential of the programme.

Strengths:

1. Strong relations with the industry and local business.
2. Enthusiastic and keen students.
3. Good potential of the programme for the local industry.

Weaknesses:

1. Low in-time graduation rate.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme.

From the annex MCEO_kartejums_8_pielik.xlsx is clear that study courses are complementary and correspond to the objectives of the programme. The professional qualification standard is renewed in 2021 and respective changes in the study programme are introduced in the same year. The head of the programme works closely with industry and past Alumni in developing the programme - with many Alumni holding managerial roles in industry. Employers praised graduates from RTU concluding that they bring knowledge and expertise that are relevant to the local needs and optimisation of the legacy and new systems. Employers provide opportunities for excursions and fully support the institution in this regard. Employers pointed out that graduates are ready for independent work as designers or managers, which is an indicator of the strong and well developed programme. Considering today's trends in mechatronics development and use of more and more smarter machines there is one quite theoretical course related to AI (DSP332 - Fundamentals of Artificial Intelligence 3.0) and some courses related to PLC-s and SCADA systems (DAI462 - Computer Control (Study Project), DAI505 - Peripheral Devices for Controllers PLC and DDI713 - Introduction to Industrial Systems SCADA) but none high level programming courses, which was a complaint from the students during the interviews.

2.2.2. Not applicable

2.2.3.

The Employers point out the need for support for graduates at the beginning of their professional career.

Students appreciate modular teaching methods.

For major profiling courses the group tasks, individual tasks are set for students.

2.2.4.

The document in annex Internship_Management_Procedure.pdf declares the internship organization and management process. 20 CP are splitted into four parts: Production training practice 4 CP; Practical Placement of Engineering 4 CP; Designer practice 4 CP; Practical Placement for PreGraduation Project 14 CP.

2.2.5. Not applicable

2.2.6.

The topics of the Bachelor's thesis projects are mostly related to solving real problems in a particular company. For elaboration of projects students have to use their practical designer skills from study courses.

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

Overall the content of the study programme meets all the relevant legislative regulations and focused on the needs of the industry.

Strengths:

1. Interdisciplinarity - study courses provided by teaching staff from three RTU departments.
2. Wide implementation of Moodle learning platform.
3. Some study courses are implemented in English by inviting guest lecturers every year.

Weaknesses:

1. Insufficient high level programming language courses.
2. New trends in mechatronics, as AI, machine learning, Big Data need more focus.
3. Insufficient student access to advanced measurement tools in the laboratory.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. Specific mechatronics laboratory equipment obtained with FESTO company support. Metrology laboratory developed and equipped with Mitutoyo company support. RTU HPC (High-Performance Center) provides free access to design and scientific software. Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. Graduates pointed out the lack of advanced measurement tools in the laboratory.

2.3.2. N/A

2.3.3.

Funding comes from the state budget; just 1..4% of students study for tuition fees. in general, the funding available to the study programme, funding sources and the use of funding ensures full implementation of the study process. The study programme has the minimum number of students to

ensure the profitability of the study programme. The profitability of the study programme is evaluated and regulated.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Strengths:

1. Interdisciplinarity - study courses provided by teaching staff from three RTU departments.
2. Wide implementation of Moodle learning.

Weaknesses:

1. Graduates pointed out the lack of advanced measurement tools in the laboratory.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

SAR does not specify the list of teachers involved in teaching courses of Mechatronics programme exactly. It contains the list of all teaching staff of the responsible department. Information needed about teaching staff from other departments involved, namely, from the Faculty of Computer Science and Information Technology, Faculty of Electrical and Environmental Engineering. An enthusiastic and close and relative young team with a good mix of scientific and industrial experience. Mentioned that the senior staff are rapidly approaching retirement.

In general, the qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.2.

Number of staff who recently defended their PhD thesis have been elected for teacher positions. RTU follows-up and regularly improves the composition of teaching staff implementing the study programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4.

Teaching staff publications comply with the Law on Higher Education Institutions (SAR p.p.123,124). The academic staff is active in research and publishing, each member in the last six years has publications in peer-reviewed editions, including international editions. The RTU motivates the staff scientific activities.

2.4.5.

In some study courses, theoretical classes are given by one lecturer, but practical classes - by another lecturers. Regular academic conferences and professional development seminars are held. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

An enthusiastic and close and relative young team with a good mix of scientific and industrial experience. Staff is running industrial training courses and keen to continuously develop the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. Indications of young academic staff growth.
2. Active and specialty enthusiastic staff.
3. Noticeable contribution to improvement of laboratories by the staff.

Weaknesses:

1. Senior staff are rapidly approaching retirement.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. The collaboration mechanisms between the academic staff members are in place. In general, ensured all conditions for the implementation of the study programme.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Mechatronics engineer, approved on 09.02.2022. <https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-210.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. Overall the content of the study programme meets all the relevant legislative regulations and focused on the needs of the industry. The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level.

Strengths:

1. Interdisciplinarity - study courses provided by teaching staff from three RTU departments.
2. Wide implementation of Moodle learning platform.
3. Some study courses are implemented in English by inviting guest lecturers every year.

Weaknesses:

1. Insufficient high level programming language courses.
2. New trends in mechatronics, as AI, machine learning, Big Data need more focus.
3. Insufficient student access to advanced measurement tools in the laboratory.

Evaluation of the study programme "Mechatronics"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Mechatronics"

Short-term recommendations

Improve the level of programming language courses

Long-term recommendations

Follow the new trends in mechatronics, as AI, machine learning, Big Data need more focus, provide better access to advanced measurement tools in the laboratory

II - "Heat Power and Thermal Engineering" ASSESSMENT

II - "Heat Power and Thermal Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The content of the professional study programme "Heat Power and Thermal Engineering (42522)" is developed and updated in accordance with Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education". The study programme is the only one in Latvia. The study programme complies with the study field.

2.1.2.

The programme is 4 years Full time and 5 years Part time duration and 160CP. Programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme. The programme was updated in 2021 to comply with the new 2021 occupational standard. The new standard was agreed at the Tripartite Cooperation Sub-council of Vocational Education and Employment meeting on 11 August 2021, the updated version of the occupational standard of engineer in heat power and thermal engineering was approved. This work is ongoing. During the accreditation visit there was discussion around the suitability of the programme title and the need to balance programme content relevant to near-term sovereign needs and the long-term climate change agenda covering issues of sustainability and green technologies.

2.1.3.

Since 2013 a number of changes have been made to the study programme. These include the inclusion of the compulsory course (SDD700 - Innovative Product Development and Entrepreneurship) and the removal of sports activities as part of the course. As noted above, in 2021, a number of changes were made including the elective course: MT251 "Building Materials" (Basic Course), BBR453 "Building Technology", BGE296 "Geodesy", and BTG711 "Building Information Modelling". Further improvements are to be undertaken in 21/22 and beyond. The most recent changes were to MSE "Fundamentals of Ecology" which has been totally revised to reflect the new standard.

2.1.4.

The programme originates from the sovereign requirement for centralized heating systems (district systems) which is unique to Latvia and requires specialist graduates. Latvia is constructing a number of power plants based on combined gas and steam cycles. These include: 26 bio /food waste power plants – 1MW to 6MW); 40 gas and 70 biomass. Graduates focus on either design and planning of new systems, execution of construction or operation of installed assets. The course supports all three streams.

Government analysis of the numbers for the nation are 150 specialists in total. Until this year, the target for the course is to graduate 10 each year to meet the ongoing and increasing needs. The recent conflict and changes in the region are likely to drive an increase in the numbers required to ensure independence. The department are visiting schools and recruitment events to increase the intake for 2022 and beyond. Such outreach and recruitment activities could also been performed in conjunction with the Alumni / industry.

A number of the staff work part time in industry and these links are used in combination with lectures from past graduates. Last year there were 5+ guest lecturers. When interviewed, students stated that they enjoyed the guest lectures and would like additional ones, particularly from entrepreneurs and start-ups in the area and / or operating in the energy sector. Students were aware of such companies in Latvia but have no interaction or courses related to these aspects.

Students commented on limited graduate opportunities and that their areas of growth were in renewables and alternative energies and related sectors such as marine. Consequently, it would be very beneficial for the course to reflect these aspects. The consensus of current students was that this would also make the programme more attractive to prospective students.

Jointly delivered with colleagues from Civil Engineering. Evidence of regular course reviews and updates and regular meetings to discuss minor changes to content. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review also considers professional standards.

2.1.5. Not applicable

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

Overall the programmes are well designed and have been improved and updated to meet new national standards. The process of updating the programme is ongoing. There are two interrelated areas for longer-term consideration. These concern the programme title and the need for the programme to comprise content that meets the near-term sovereign needs and the long-term climate change agenda covering issues of sustainability and green technologies.

Strengths:

1. Strong relations with the industry and local business.
2. Continuous improvement of programme content and opportunities presented by the new National standard.

Weaknesses:

1. Programme title is not contemporary and nor does it reflect the climate change/renewables agenda.
2. No clear initiatives of international benchmarking have been found in order to monitor own progress and to focus the development of the study programme.
3. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities is very low.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The programme was updated in 2021 to comply with the new 2021 occupational standard. The new standard was agreed at the Tripartite Cooperation Sub-council of Vocational Education and Employment meeting on 11 August 2021, the updated version of the occupational standard of engineer in heat power and thermal engineering was approved.

Recent changes to standards and construction guidelines require graduates to have relevant certificates in construction. As a consequence courses in Geodesy, Building Technologies, BIM and building heat transfer have been incorporated into the Bachelors programme. In addition CAD, CAE design and simulation courses have been introduced from the Mechanical Engineering department.

While the Department has a number of international collaborations (Lithuania and Japan) and uses these to understand state-of-the-art and competitors, and guide the development of the programme, none of the students interviewed had been involved in any international exchanges. The main reason/barrier was cited as holding a part time job.

While the programme includes a module on (non-standard) alternative energy sources covering solar, fuel cells, greater attention should be given to new and emerging technologies. This desire to be exposed to and taught state-of-the-art was reinforced by all students interviewed. Data shows that the course on alternative energy is one of the most popular elective units in the faculty with 70+ students.

The Department works closely with industry and past Alumni - with many Alumni holding managerial roles in industry. Two of the Alumni interviewed are studying for PhDs so have greater interaction with the Dept. Others would be happy to support the institute but have limited time. If they were to interact with the institution, it needs to be mutually beneficial. One Alumni has supervised projects and given some guest lectures.

Employers praised graduates from RTU concluding that they bring knowledge and expertise that are relevant to the local needs and optimisation of the legacy and new systems. Employers provide opportunities for excursions and fully support the institution in this regard. Employers also provide scholarships and prizes.

A number of employers have been involved in a review of the programme conducted a year or so ago, and worked with RTU on standards. In accord with students, employers are keen that the programme comprises a greater consideration of sustainability.

2.2.2. Not applicable

2.2.3.

Programme includes a range of practical/lab work within the courses. During the accreditation visit staff stated that 20% was the target for the amount of practical work. Students felt that the first year was very theoretical and that the high mathematics content can contribute to many students

losing motivation and ultimately leaving the programme.

The SP report states that student centric learning is implemented in a number of specific units (MSE424 and MSE281) but the specific details of 'what' and 'how' are not fully reported.

In order to accommodate international students, the Department uses courses from the Mechanical Engineering Department that are taught in English. This is an area that the Department is seeking to address over the next few years. Student-staff ratio is 10:1. So a very small cohort and staff work closely with students to teach, support and mentor them.

2.2.4.

In the fourth year students complete a compulsory internship - in accordance with Cabinet Regulation No. 51 of 26th August 2014. The duration of the internship in the Bachelor study programme is 26 weeks with a volume of 26 CP. Students are required to maintain a diary of their internship logging the experience, training and work done. A range of internships are made available to students but students can find their own if they wish. Interviews with the students during accreditation revealed that some students felt that a single internship can limit opportunities and that a number of shorter internships at a couple of organizations operating in different areas would be beneficial.

2.2.5. Not applicable

2.2.6.

Topics of final theses/dissertations provided in the self-assessment report (pg 144) are relevant to the field and appropriate for the study programme. These titles listed relate largely to characterising and optimising current heat and power systems. In accord with other comments relating to this study programme, the titles do not reflect more contemporary topics associated with climate change and state-of-the-art e.g. renewables.

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

The programme has been updated recently and is already broad. It is clear that a balance needs to be sought between programme content that supports sovereign capability (near term) and that links to the future addressing emerging green/sustainable technologies.

Strengths:

1. Strong industrial links and input from industry.

Weaknesses:

1. Relatively few units delivered in English / reliance on the ME department to deliver units in English.
2. Few, if any, students and staff have been involved in international exchanges.
3. Dissertation topics could be expanded to cover contemporary topics such as renewables, nuclear etc.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Kipsala Campus. As a consequence, the majority of classes and laboratories are now on a single site. Newly refurbished facilities are available at the Kipsala site in addition to existing facilities at Laboratory House. During the reporting period ~€ 240k has been invested in new equipment. Alongside this, various laboratory activities (~40) have been developed and funded under the European projects framework.

The Staff reported that digital and physical resources are refreshed throughout the year with the self-evaluation report highlighting 50+ new textbooks purchased during the period. Alumni observed that much of the material (books) were based on Russian technologies and materials, and that a far greater proportion of international material/resources are needed to reflect the state-of-the-art and new technologies. This is partially mitigated by the recent textbooks but 'refresh and updating' should continue apace.

In contrast to books, students commented on the relative lack of availability and access to the latest software for design and operation of plant. The students also highlighted a lack of modules that teach these tools and their principles.

Access to standards is limited to computers in the library. During the accreditation visit, students stated that it would be helpful if these could be made more widely available, particularly given the transition to hybrid/distributed working.

2.3.2. Not applicable

2.3.3.

Total funding for the programme has fallen below €100k for 19/20 and 20/21. The majority of this budget is the state budget.

Overall numbers have been falling since 2014. Completion rates are relatively high at ~60% Bachelors. Intake for 2021 is quite low at 12. The falling numbers is a challenge across the institution. Students also expressed concerns about the falling numbers and suggested that greater attention to the green agenda and alternative energies would help mitigate this.

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

Resources for the study programme have been improved over recent years and further update and refresh - particularly of books, software and software and access to standards is needed.

Strengths:

1. Significant and ongoing investment has been made in laboratories.

Weaknesses:

1. Resources and access to resources appear limited and in some cases are based on out-of-date technologies.
2. Greater resources should be provided for standards and non-standard (international) energy generation technologies/approaches.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

The study programme's resources, material, technical and financial provision is partially compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. Further improvement to be made to books, standards and software.

2.4. Teaching Staff

Analysis

2.4.1.

The age distribution of the current staff is with two professors in the +60's, 2 doctor academics in their 40's and 2 to 3 junior doctor academics in their 30's. Whilst the range of staffing is acceptable, it will be important for RTU to retain and promote all the junior members of staff, in addition to attracting new replacements to ensure the taught course provision. Overall numbers of teaching staff have reduced slightly over the reporting period from 12 (13/14) to 9 (21/22). 67% of teaching staff hold doctorates while all staff bring specialisms (inc. practical) relevant to the study programme.

Staff attested to a good range of training courses provided by the institution and excellent support from colleagues. In addition, RTU has implemented a good training programme including seminars and training in specific areas. According to the self-evaluation report (pg 72), RTU has implemented a new procedure and guidance on promotion criteria. However, of the staff interviewed many were unaware of this.

2.4.2.

They are a small department, and this lends itself to team teaching. The collaboration with Civil Engineering ensures that the right expertise and knowledge can be given to the programme. This also provides some redundancy.

Staff felt that they have a lot of influence over the content and that because they are a small department the regular meetings provide the opportunity to discuss and review the changes. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review considers professional standards.

2.4.3. Not applicable.

2.4.4.

The Department contributed to the production of two new national standards last year (20/21). During the accreditation visit it was stated that the Department aims for all staff to publish 3-4 articles a year and are looking to do more particularly with a younger composition of academic staff. Although not analysed for the specific staff members, the above values appear consistent with the overall number of publications in the period. The institution and faculty provide training and signposting for conferences. This was considered helpful but staff have limited time to attend conferences due to their portfolio of activities.

2.4.5.

This is a jointly in mutual cooperation of the teaching staff in the implementation organized study programme. There are related programmes in Civil e.g., HVAC but this programme is about integrated systems with a distinct focus on smaller scale power generation. Teaching and dissertations are supervised by colleagues from both faculties. They are also jointly supervising doctoral students. This demonstrates strong collaboration and team working. A joint seminar

programme (pg 151 self-assessment) has been initiated.

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

An enthusiastic and close team with a good mix of scientific and industrial experience. Staff are research active and keen to continuously develop the programme to meet near-term sovereign needs and emerging technologies.

Strengths:

1. High level of collaboration in the programme leverages the benefits/strengths of both departments.
2. Active research culture.

Weaknesses:

1. Senior staff are rapidly approaching retirement.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. The collaboration mechanisms between the academic staff members are in place. In general, ensured all conditions for the implementation of the study programme. Greater than 67% of instructors hold a scientific degree.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Engineer in Heat Power and Thermal Engineering, approved on 11 August 2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-169.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments.

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

Overall the programmes are well designed and have been improved and updated to meet new national standards. The process of updating the programme is ongoing. Underlying all the assessment areas are two interrelated areas. The first concerns the programme title and if/whether it adequately reflects the taught content. The second concerns the balance of the content of the study programme aimed at meeting the near-term sovereign needs (constraints) and the long-term (opportunities) associated with sustainability and green technologies.

Strengths:

1. The programme is unique to Latvia and accordingly has long-standing, deep relations with the industry and local business.
2. Ongoing process of laboratory refurbishment and 'updating and refresh' of books and software.
3. High level of collaboration in the programme leverages the benefits/strengths of both departments.
4. Active research culture.

Weaknesses:

1. Programme title is not contemporary and nor does it reflect the climate change/renewables agenda.
2. Relatively few units delivered in English / reliance on the ME department to deliver units in

English.

3. Few, if any, students and staff have been involved in international exchanges.

4. Dissertation topics could be expanded to cover contemporary topics such as renewables, nuclear etc.

5. Senior staff are rapidly approaching retirement.

Evaluation of the study programme "Heat Power and Thermal Engineering"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Heat Power and Thermal Engineering"

Short-term recommendations

Consider modifying programme titles to include heat and power systems which may better reflect the focus of the programme – production to consumption.

Staff appeared unaware of the new requirements for promotion. Local training / dissemination events should be held by the institution to brief staff.

Department should review the software tools and teaching/training with these tools with the aim of ensuring that the software is up-to-date and representative of the industry.

Explore opportunities to involve Alumni in the programme via mentoring activities, guest lectures (could be online) and advisory boards.

Several Alumni reflected on poor communication and lecturers not turning up and there being no communications about this. This was on the more general units rather than the direction specific units.

Increase the number of modules delivered in English. This will likely be attractive to international students.

There are a number of guest lecturers from industry, and these could be increased to supplement modules and anchor material in industrial cases early on in the course (years 1 and 2).

Long-term recommendations

One of the most popular modules related to alternative energy systems. Similar units could be introduced for other disciplines. The programme team might also consider additional units that relate to the green agenda and the future.

Continually review opportunities for education and training in regard to Nuclear and monitor government priorities.

Opportunities to grow the scientific research activities should be considered alongside changes to the programme that reflect the green agenda and emerging technologies.

Given the support from employers, explore opportunities to host joint events/talks at High Schools to help recruitment.

II - "Automotive Transport Engineering " ASSESSMENT

II - "Automotive Transport Engineering " ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Professional bachelor study programme Automotive Transport Engineering provided in two modes: full-time studies with a duration of 4 years and 6 months and part-time extramural studies with a duration of 5 years. Both modes are provided in Latvian and contain 180 credit points. The study programme is fully compliant with the study field. It provides students with knowledge, skills and competencies required by transport businesses and Latvian employers. This is confirmed by the final examination - Bachelor's Thesis with a Design Project, which contains research, machine design and production technology sections (exposition).

2.1.2.

The duration of the programme allows for obtaining a professional bachelor's degree in Automotive engineering and qualification in Automotive engineering.

2.1.3.

A number of new study courses have been implemented (SAR pages 285, 286) to fit the requirements of the State standard of the profession "Automotive Transport Engineer".

2.1.4.

Automobile Engineering in Latvia is a fragmented industry – with no major national manufacturer. Evidence is lacking in terms of industry/national needs. Content and interests appear to be more around safety, logistics and maintenance.

Automotive Transport Engineering, including road traffic safety, accident investigation and vehicle testing and certification, are the graduates' tasks (graduates/employers). All employers spoke highly of the graduates and employ a small number of graduates each year. They particularly commended the theoretical basis and practical skills/knowledge. Graduates praised the breadth of the programme (systems perspective) and the range of industry experts. Students were unanimous in the need for practical equipment/laboratory for the automotive programme back in 2018/19.

Students raised a lack of lectures in English. Employers suggested that the programmes include greater attention to new technologies. Employers have a lot of interaction, but there is no explicit mechanism/forum to help shape the curriculum. For example, in the Automotive Engineering discipline, the employers praised the additional technical and project skills of Masters's students and that it positioned them for more senior roles. Students have had little to no interaction with the institution. But would be prepared to return and support the institution.

The international benchmarking initiatives of the study programme remain unclear for the administration of the programme. Students' participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities is very low.

2.1.5. Not applicable

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

Overall the study programme is well designed and has been improved and updated to meet new national standards. All study programme's parameters are interrelated and based on students and industry needs.

Strengths:

1. Full-time and part-time options for study programme implementation open more choices for applicants.
2. New study courses were introduced to the programme during the reporting period.
3. Students would be prepared to return and support the institution.

Weaknesses:

1. Lack of lectures in English.
2. No clear initiatives of international benchmarking have been found to monitor their own progress and focus on the development of the study programme.
3. Students' participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities is very low.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

In 2017 EV units were introduced and the course content is under review and discussions with Latvian manufacturers for buses and parts. Long-term plan is to develop an EV power train lab. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The content complies with national state education standard and professional standard to obtain the professional qualification. The study programme content is regularly reviewed, improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing.

The general education, general engineering and specialized courses as well are included in the curriculum and evaluated as adequate.

2.2.2. Not applicable

2.2.3.

Student-centred learning principles are implemented (students specify).

Course feedback forms are completed by students and their perspective is that the feedback is listened to and changes are made. Some teaching staff highlight changes made in response to student feedback at the start of their course.

Students can choose their orientation/direction between rolling stock, infrastructure and overall systems. Although not explicit, the staff work with students to match internship and final work.

Study implementation methods are appropriate for the realizing of the study programme and ensuring the achievement of the learning outcomes.

2.2.4.

The internship is organized in the autumn semester for the 3rd, 4th and 5th year students with a credit distribution of 5 + 5 + 10 CP. Students have different opportunities for choosing the way the internship could be organized (SER p.293). Students present an internship report drawn up according to the requirements of methodological guidelines for internship. Supervisor from an industrial company draws up a reference letter about the internship completed by the student.

2.2.5. Not applicable

2.2.6.

Students use laboratories for practical / workshop skills. First year is largely theoretical. Practical aspects increase in the 3rd and 4th year. Student project work - mix of industry-led and fundamental

research. Many students are working in industry and will propose topics accordingly. A comprehensive list is also provided which includes current research. Students' final theses topics are relevant to the field and correspond to the study programme.

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

Overall the study programme is well designed and has been improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing. Student-centred learning principles are implemented.

Strengths:

1. Consideration of results of student`s feedback.
2. Final work topics initiated from industry.

Weaknesses:

Not identified

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. In 2017 EV units were introduced and the course content is under review and discussions with Latvian manufacturers for buses and parts. Long-term plan is to develop an EV power train lab. Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. The general education, general engineering and specialized courses as well are included in the curriculum.

The study programme`s resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Students agreed that the resources were adequate and, in some cases, very good. Additional videos of lectures and laboratory activities would be beneficial.

Only one academic used Moodle and this was very good. They would like more.

Computing facilities and software are available and up-to-date, e.g., Fusion.

2.3.2. Not applicable

2.3.3.

Most of the funding for the study programme comes from the state budget. The costs per student within the study program, calculated by the Office of the Vice-Rector for Finance, have risen from EUR 3866 to 4463 on average near 2 % per year (SER p.p.298,299).

The number of students enrolled in the study programme with funding from the state budget varies from 55 to 69.

The number of full-time students admitted for a fee has changed from 0 to 15, the number of part-time students has ranged from 7 to 24.

The funding available to the study programme is appropriate, funding sources and the use of funding are evaluated and ensures full implementation of the study process.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Strengths:

1. Facilities and software are available and up-to-date.
2. The costs per student have risen on average near 2 % per year

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

Staff are qualified appropriately and complies with the requirements for the implementation of the study programme and the requirements set forth in the regulatory enactments. Teaching staff involved in the study programme enables the achievement of the aims and learning outcomes of the study programme and the relevant study courses. Introduced EV courses prior to recruiting the staff. Have attracted staff from overseas institutions.

2.4.2.

The composition of the teaching staff affects positively the quality of the implementation of the study programme. 4 of teaching staff are with a doctoral degree (8th LQF level) and 6 with a master's degree (7th LQF level). RTU provides the general training for teaching across RTU covering online and F2F and group learnings. Monthly meetings provide a forum for discussing changes to courses and content.

2.4.3. Not applicable

2.4.4.

The Automotive Engineering department is only about 4 or 5 persons. All staff members of the Department are publishing around one paper per year. By staff publishing rate 1+ papers per year, the teaching load is appropriate and between 4 and 8 hours a week.

There is a formal process for approving any changes that includes review and feedback from colleagues in the Department.

2.4.5.

The programme and matters such as quality, integration etc. discuss regularly with students and employers but no evidence of an explicit review. The collaboration mechanisms between the academic staff members are in place.

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

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. Staff is running industrial training courses and keen to continuously develop the programme to meet the future industry needs and to develop collaboration with industry. In general, ensured all conditions for the implementation of the study programme.

Strengths:

1. High teaching staff qualification.
2. Active in research and publications.
3. Teaching staff cooperation improves teaching and learning.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. The collaboration mechanisms between the academic staff members are in place. In general, ensured all conditions for the implementation of the study programme.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014
""Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with requirements of the professional standard of Automotive Engineer, approved on 13.10.2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-182.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

Compliance provided in SER Annex MCUO_diploms_dipl_supple.zip.

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. Overall the content of the study programme meets all the relevant legislative regulations and focused on the needs of the industry. Teaching staff composition is appropriate for successful implementation of study programme.

Strengths:

1. The programme course map shows full compliance of the programme with actual professional standards.
2. Teaching staff qualifications and facilities provide successful implementation of the programme.

Weaknesses:

Not identified

Evaluation of the study programme "Automotive Transport Engineering "

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Automotive Transport Engineering "

Short-term recommendations

No short-term recommendations offered

Long-term recommendations

Consider modifying programme titles to include systems (safety, reliability and operation). Such a change appears to also reflect the destinations of the graduates and the employers that attended the evaluation.

Conduct a formal review and mapping of programme, courses, topics and learning outcomes (skills and knowledge). This will help build shared understanding across all teaching staff and identify areas for improvement and evolution of content.

Consider training and best practice for mentoring new staff. There are some good examples, but experiences are mixed. Greater exposure to practical/applied skills in years 1 and 2.

Good practice is to close the loop on student feedback. This can be done at the course level i.e., what has changed since the last year or can be summarized to all students at the start of the year.

Upgrade/update Automotive Engineering laboratory equipment.

Explore opportunities to involve Alumni in the programme via mentoring activities, guest lectures (could be online) and advisory boards.

Consider opportunities to involve Employers in review and updating of programme via a formal review / workshop. A number of employers commented on the fast-changing technologies in their field and that some modules that covered emerging technologies in the industry could be beneficial.

II - "Aviation Transport" ASSESSMENT

II - "Aviation Transport" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Professional Bachelor study programme "Aviation Transport", provides Professional Bachelor Degree in Aviation Transport and does provide two options for qualifications: Aircraft Maintenance Mechanical Engineer or Aircraft Maintenance Avionics Engineer. The content of the professional study programme is developed and updated in accordance with Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education". In general, the study programme is appropriate for the field.

2.1.2.

This is the first (undergraduate) academic degree, Level 6 of Latvian and European Qualification Frameworks. In SAR, the programme is declared as full time, 4 years, 160 Credit Points. Languages of instruction are Latvian and English. Admission requirements for the programme provided in Latvian are General or Vocational secondary education. The assessment of the level of English language proficiency under the requirements specified in regulatory enactments in addition implemented to be admitted to the programme provided in English.

2.1.3.

The structure and duration of the study programme are appropriate. The teaching staff have stated that the taught Masters programme goes beyond theory, background and operation of the Bachelors degree, to provide the necessary skills and knowledge that is relevant to this aeronautical discipline. The students acknowledged that guest lectures/seminars from industry was a benefit to the programme. It is positive to see the local aviation industry supporting the taught degrees.

2.1.4.

The programme originates from the need for aviation university education in Latvia. In addition to the taught degree content, the Aviation course also allows for students to take the EASA Part 147 written examinations, have their attendance recorded (in compliance with EASA rules) and gain practical experience in a Part 145 aircraft maintenance environment. This effectively allows students to gain both the degree and the EASA maintenance B type licence (with subsequent experience) on graduation.

Due to recent international events, (e.g. COVID pandemic) the effects of such on the aviation sector remain unclear for Europe. However, the local aviation industry has stated that all the licensed graduates that approach the local airline will be recruited and employed due to the on-going shortages of skilled and educated engineers. Likewise, one aviation company has stated that there is an annual need for graduating masters students of around 10 candidates per year. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities are very low (based on the Aviation Transport MGAO data) that is in 2018 (3 students) & 2019 (1 student). Students commented on the local opportunities in the sector, and that they remain confident to be able to find relevant work upon graduation.

2.1.5. Not applicable

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

Overall, the programme is very well designed and fully compliant with normative regulations and the EASA part 147 requirements. The long term considerations are to retain the EASA certifications and to ensure that students attending the courses are fully encouraged to take the examinations, to support the local aviation industry.

Strengths:

1. The combination of the degree with the EASA part 147 programme and strong relations with the

local industry and business.

Weaknesses:

1. From the managerial point of the programme no clear initiatives of international benchmarking or comparison have been found in order to monitor own progress and to focus the development of the study programme.
2. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities are very low.
3. A minor weakness is the Part 147 element is an externally awarded license/ recognition that is overseen by the Latvian CAA, and any possible deviation from EU Aviation law would result in the loss of this valuable achievement.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content of the study programme is fully relevant and topical. The SAR states that the study programme Aviation Transport has been developed taking into consideration proposals from employers and the demand of the labour market. The content of the study programme is fully relevant and topical and it complies with the aims of the Professional Bachelor study programme "Aviation Transport".

2.2.2. Not applicable

2.2.3. The content of the study courses / modules is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes, as well as meets the needs of the industry, labor market and scientific trends. It fully complies with the EASA Part 147 requirements and the national regulations (state education standard, professional (occupational) standard or professional qualification requirements).

The SAR states that student representatives have participated in the development of the programme, its discussion and approval. The classes and the examinations are organised to meet the possibilities and needs of the students while they combine studies with work. Examination methods, criteria and the procedure for appealing the assessment are available to the students and they are informed about it. Students are introduced to the expected learning outcomes of each course and the report form, also expected tests at the beginning of the study course. The content of the course, expected learning outcomes, and recommended literature are provided in the description of each course. The results of the study process are analysed in discussions with the head of the study programme, as well as during the meetings of the AERTI Council. The study implementation methods contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. Student-centred learning and teaching principles are considered and appropriately organised.

2.2.4.

The internship at RTU is organised according to the "Procedure for Organising Internship at Riga Technical University" approved by the RTU Senate. The scope of an internship for this study programme is 23 Credit Points. Internships are intended to be undertaken at companies, which have signed a cooperation agreement. The number of interns can be 2-5 students per year in small companies and up to 70 students in larger companies such as AirBaltic and Aviatest per semester.

An internship offered to students, as well as the organisation of work are effective and often involve the use of students in the local aviation hangers. The tasks of the internship are related to the learning outcomes achievable. The internship complies with the requirements of regulatory enactments, which is positive. The inclusion of the internship with the EASA 147 requirements is considered to be a very beneficial strength for both students and the University.

Additionally, language is considered separately and formally as part of the Part 147 organisational award requirements.

2.2.5. Not applicable

2.2.6. The topics of students' final theses are relevant to the field and correspond to the study programme. Examples of student final thesis [3.2.6] (for 2020) includes examples such as "Development of High Reliability Aviation Electric Generator," "Development of an Autonomous Seaplane Prototype" etc.

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

The programme is highly pertinent to the objectives and requirements of the study programme. The programme has been updated and meets the needs that support both the wider industry and the sovereign capability.

Strengths:

1. Student-centred learning and teaching principles are considered and appropriately organised.
2. The inclusion of the internship elements of the degree with the external requirements of the EASA licence elements is considered to be very positive and supplemental.
3. Student access to live aircraft changes, as required by European law, is well considered and addressed.

Weaknesses:

Not identified

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The overall scope of the material resources and equipment are impressive. The SAR states that RTU Ķīpsala Campus currently has 54 study rooms, 187 laboratories, 19 special training rooms, 10 computer classrooms, 12 workshops and several research centres of national importance. For the implementation of the study programme the in premises of the Institute of Aeronautics hereinafter - the Institute) of Riga Technical University (at Ķīpsalas Street 6B and Lauvas Street 8 in Riga), 23 study rooms and specialised study rooms, training laboratories, workshops and simulation facilities are equipped with computers, projectors, webcams, audio systems, and other technical aids. The

rooms for lecturers are equipped with computers with Internet connection and printers. However, the study provision, scientific support, informative provision, including libraries, material and technical provision, and financial provision partly comply with the aims, specific features and implementation conditions of the Professional Bachelor study programme “Aviation Transport”, to create strong prerequisites for the achievement of the learning outcomes of the study programme, and indicate the possibility to ensure a high-quality study process also in the future.

The staff reported that there was an ambition in the department to develop the programmes including digitalisation of the study provision. Unfortunately, as some of the core staff are new to the post, they were not able to identify the previous issues or the advancement that have been made since that time. Students commented that access to digital resources in the library was limited, extending from the print media to the digital access of journals and periodic searching/ viewing. The implementations of these resources for the study programme are identified as an area for improvement, by both the students, the staff etc.

The staff did not appear to be aware of the European Commission’s environmental ambitions, such as FlightPath 2050 or The Master Plan. The staff did comment that their required update training has been successful in recent years, and has included newer and relevant CAD software training. However, the students commented that they sometimes found it difficult to access the software to conduct these activities/ assignments and were forced to use their own machines and attempt to obtain software by other means.

2.3.2. Not applicable

2.3.3. Total funding for the programme is based upon the student numbers recruited. The majority of this budget is the state budget.

The SAR indicates that financial resources of the study programme are sufficient for successful implementation of the study programme and their use is regularly controlled by the administration as well as RTU Office of ViceRector for Finance. The average cost per student in 2013-2020 was 5468.87 EUR. The number of study places is allocated after negotiations with the Ministry of Education and Science. However, this positive point regarding financial resources contradicts with relatively low (or non-competitive) teachers salaries and very high teaching workloads. Completion rates are relatively high from 2016 to ‘21 which is considered as a positive.

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

Most of the resources required to deliver the programmes are currently available, from full time, external part time and guest lectures being provided.

Strengths:

1. The inclusion of industry know-how and direct involvement of the course is considered a positive. Student numbers appear steady.

Weaknesses:

1. An identified weakness is that not all the students have sufficient access to library resources, IT terminals, relevant IT software etc., and are reliant on finding computing/ software etc. to overcome this obstacle.

2. The resources assigned to support the implementation of the study programme (access to library resources, IT terminals, relevant IT software) are identified as a shortcoming.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

Most of the resources required to deliver the programmes are currently available. During the on-site meetings was identified is that not all the students have sufficient access to library resources, IT terminals, relevant IT software and are reliant on finding computing/ software to overcome this obstacle.

2.4. Teaching Staff

Analysis

2.4.1.

The SAR indicates that the numbers and the composition of the teaching staff remains quite stable over the assessment period. In 2013/2014 there were 31 teachers in total, in 2021/2022 - 37 teachers. 6 out of 37 teachers are the guest teachers. The core academic faculty in numbers were the following in 2021/2022: Professors - 10, Associate Professors - 4, Assistant Professors - 11, Lectures - 4, Assistants - 2.

The staffing levels appear to be sufficient prima facie, with the department claiming to employ 56 teaching staff and researchers for the discipline. A large number of external staff from industry are invited into University to teach some of the modules to the students. Typically these are external employees from industry, such as Air Baltic company. The requirement for all of the teaching staff to be in possession of a full teaching diploma is not clear, and would not be possible for external lecturers.

2.4.2.

The unit is a small department, which is considered very complementary to support the teaching activities. The close industrial participation in the form of external experts providing guest lectures and externally hired part time lecturers was considered to be a positive feature. The students commented that they felt those aspects were really positive and helpful.

2.4.3. Not applicable

2.4.4.

The Department aims for all staff to publish 3-4 articles a year and are looking to do more particularly with a younger composition of academic staff. The institution and faculty provide training and signposting for conferences. This was considered helpful but staff have limited time due to their portfolio of activities.

However, the full time staff are very busy with high levels of teaching and student contact. Additionally, a number of the teaching staff have yet to complete their doctoral degree thesis and formally complete that process. This very high level of teaching duties coupled with staff completing their doctoral studies part time is potentially problematic, and could affect the viability of the programme - especially if the junior staff leave for another employer. The University does not adequately explain how these staff members will satisfactorily meet their work requirements and achieve their doctoral studies in a timely manner. This is a shortcoming.

2.4.5.

This is a jointly in mutual cooperation of the teaching staff in the implementation organized study

programme. One of the cooperation mechanisms is the implementation of study projects within the framework of several successively implemented study courses. Meetings of the structural units are organized at least once a week. A student-centered approach in teaching is provided. Joint supervising of the final year projects and periodic meetings demonstrates strong collaboration and team working of the academic staff.

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

Most of the teaching staff resources required to deliver the programmes are currently available, from full time, external part time and guest lectures being provided. External teaching staff usage is unclear (pedagogical training), junior staff members high teaching loads and the difficulties associated with staff studying for their doctorate whilst working.

Strengths:

1. The inclusion of industry know-how and direct involvement of the course is considered a positive.

Weaknesses:

1. An identified weakness is that the junior staff members' have very high teaching loads and the personal study duties of these staff members seeking to gain their doctorate is not adequately explained, as to how the University will support their academic completion.
2. The department does not adequately explain academic staff retention, such as how the resourcing challenges can be improved, to reduce the chances of these junior staff members from leaving the University for other forms of employment.

Assessment of the requirement [7]

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

Assessment of compliance: Partially compliant

Most of the teaching staff resources required to deliver the programmes are currently available, from full time, external part time and guest lectures being provided. External teaching staff usage is unclear (pedagogical training), junior staff members high teaching loads and the difficulties associated with staff studying for their doctorate whilst working.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 ""Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Aircraft Maintenance Engineer, approved on 11.12. 2019., specialisations of Aircraft maintenance mechanical engineer or Aircraft maintenance avionics engineer

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-127.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments.

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

In conclusion, the study programme overall is considered to be satisfactory. Most of the previous evaluation assessment action items have been addressed to a satisfactory standard. The students are pleased with the taught programme and fully understand and appreciate its direct relevance to their later employment. Likewise, the programme is taught to the same appropriate standards in both Latvian and English to the necessary high levels.

The support to the taught programme from local industry is also noted as a strength. The use of industrial experts to deliver some of the taught materials is seen by the staff and students as a significant benefit, and shows the close links and relevance to employability.

However, some weaknesses remain unaddressed. Previous evaluation assessments have identified the need for students and staff to better participate in ERASMUS mobility activities: however, the

delivery of this improvement has yet to be completed fully.

The supply use of the library's learning resources is likewise considered an area for development, moving away from the older Russian materials for newer and more recent relevant publications. Further, the use of the digital online resources for the study programme remains highly problematic, with some current students resorting to asking friends studying at other academic institutions' to use their digital credentials to obtain copies of journal and conference papers for RTU assignments. The study programme overall is considered to be satisfactory. Most of the previous evaluation assessment action items have been addressed to a satisfactory standard.

Strengths:

1. The students are pleased with the taught programme and fully understand and appreciate its direct relevance to their later employment.
2. The support to the taught programme from local industry is also noted as a strength.
3. The use of industrial experts to deliver some of the taught materials is seen by the staff and students as a significant benefit, and shows the close links and relevance to employability.

Weaknesses:

1. Previous evaluation assessments have identified the need for students and staff to better participate in ERASMUS mobility activities: however, the delivery of this improvement has yet to be completed fully.
2. The supply use of the library's learning resources is likewise considered an area for development, moving away from the older Russian materials for newer and more recent relevant publications.
3. The use of the digital online resources for the study programme remains highly problematic, with some current students resorting to asking friends studying at other academic institutions' to use their digital credentials to obtain copies of journal and conference papers for RTU assignments.

Evaluation of the study programme "Aviation Transport"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Aviation Transport"

Short-term recommendations

Review the allocation of resources, specifically computer workstations or PC clusters for the student usage and the software on the stations or on the students personal laptops.

Evaluate the teaching load of junior staff who are studying for the PhDs.

Long-term recommendations

Provide the digital access to the usual online learning repositories (is likewise poor), as students have cited a lack of access to the full journal sites. The students do not have full and unrestricted access to the knowledge based resources in the library.

Review and fulfil the variety and quantity of the relevant textbooks are not sufficient for student withdrawal services, or the reserve (non-removal) collection.

Revise in both expense and the ability of the interlibrary loan system, the students have cited difficulties to obtain the specialist books for the study programme modules.

Properly measure and address the number of new text books directly relevant for each study programme needs. Each taught unit should have at least one paper based text book for the module, and these books should be held in the library.

The programme leaders should communicate with the library staff, to ensure a more effective book purchasing strategy is identified. Once the comprehensive list of books is identified, a five year rolling action plan with the financial budget should be addressed.

Revise the use of learning resources (including the library resources/ services) for the study programmes as a core element of the study programmes.

II - "Railway engineering" ASSESSMENT

II - "Railway engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Railway engineer deals with automation of railway transport, construction and operation of the rolling stock, organization of train traffic and passenger transportation, railway communication systems, and information technologies, and electrification systems. In general, the professional Bachelor study programme "Railway engineering", realized in form of full time and part time extramural studies, in Latvian and English, appropriate for the field.

2.1.2.

According to the study program's title, aim and tasks, the study results are also formulated as all skills and competencies required for a Bachelor's degree. These skills and competencies are entirely in line with the industry requirements set out in the relevant professional standard. Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme.

2.1.3.

Major changes in the study programme, because the new State professional standard "Railway Transportation Engineer" (PS-166) was approved (updated aims, tasks, learning outcomes; course replacements and exclusions).

2.1.4.

The only that educates and trains railway engineers. The railway in Latvia has been set as the priority means of transportation. Taking into account the new railway line "Rail Baltica" to be designed and built in the near future, the demand for specialists will only grow.

Due to programme changes there are various situations with the number of students. First year students having graduated secondary school were not ready to acquire a large volume of fundamental theoretical study courses.

2.1.5. Not applicable

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

The professional Bachelor study programme "Railway engineering" (42526) complies with the study field.

Strengths:

1. Various implementation methods.

Weaknesses:

1. High dropout level at the first study year.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1. All study courses in the study programme are up-to-date and conforming to the railway sector trends. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The content complies with national state education standard and professional standard to obtain the professional qualification. The study programme content is regularly reviewed, improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing. Student-centred learning principles are implemented.

2.2.2. Not applicable

2.2.3. Mutual respect between students and the academic staff is supported. First year students wish to see interconnection between the curricula and railway engineer specialization and professional qualification. On that basis the sequence of the study courses in the study program were made and the principles of inductive learning were applied. The goal of the changes to the sequence of study courses is to let students feel that they have been enrolled in RTU exactly to pursue the qualification of a railway engineer.

The content, requirements and methods of programme implementation in English is an identical version of the program offered in Latvian.

2.2.4. Students present an internship report drawn up according to the requirements of methodological guidelines for internship. Supervisor from an industrial company draws up a reference letter about the internship completed by the student. RTU provides help with internship placement for local and foreign students.

2.2.5. Not applicable

2.2.6. Bachelor Papers with an engineering project solve the most relevant railway problems and tasks. The topics of students' final theses are relevant to the field and correspond to the study programme. No Bachelor Papers with an engineering project have been publicly presented within this study programme so far.

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

The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The content complies with national state education standard and professional standard to obtain the professional qualification.

Strengths:

1. Course map shows the programme feasibility

Weaknesses:

Not identified

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.3.2. Not applicable

2.3.3.

In addition to the basic state budget financing, the programme is also financed from the tuition fees of local and foreign students. From the academic year 2017/2018, the volume of financing from local tuition fees has been decreasing. The number of students in the study programme meets minimal requirements.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The Scientific Library of RTU provides the necessary information. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories.

Strengths:

1. Specialized laboratories, simulation and presentation software.

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

Teaching staff of study programme "Railway engineering" comprises 9 Dr.sc.ing., 3 Msc.ing. The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. Staff is running industrial training courses and continuously develop the programme to meet the industry needs and to develop collaboration with industry. In general, ensured all conditions for the implementation of the study programme.

2.4.2.

Teaching staff is comparatively young -1 is in the age group of 20-30 years old, 4 - 30-40 years old, 6 - 40-50 years old, 1 - 50-60 years old, and none - in the 60+ group. RTU follows-up and regularly improves the composition of teaching staff implementing the study programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4.

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and at least five years of practical experience.

2.4.5.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. Teaching staff is comparatively young.

Weaknesses:
Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. Staff is running industrial training courses and continuously develop the programme to meet the industry needs and to develop collaboration with industry. In general, ensured all conditions for the implementation of the study programme.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Railway Transport Engineer, approved on 11.08.2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-166.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The study programme complies with the requirements of the Law on Higher Education Institutions and other related requirements. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. The study programme can be implemented as full time and part time, also extramural, studies in Latvian and English languages.

Strengths:

1. Specialized laboratories, simulation and presentation software.
2. Teaching staff is comparatively young.
3. Various implementation methods.

Weaknesses:

Not identified

Evaluation of the study programme "Railway engineering"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Railway engineering"

Short-term recommendations

No short-term recommendations offered

Long-term recommendations

II - "Medical Engineering and Medical Physics" ASSESSMENT

II - "Medical Engineering and Medical Physics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The panel concludes that the joint with Riga Stradins University (RSU) Bachelor study programme "Medical Engineering and Medical Physics (42526)" complies with the study field.

2.1.2.

According to the self-assessment document provided by the Study Programme, the professional Bachelor study programme "Medical Engineering and Medical Physics" title, aim and tasks, the study results are also formulated as all skills and competencies required for a Bachelor's degree. These skills and competencies are entirely in line with the industry requirements set out in the relevant professional standard. Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme. As provided from RTU and proofed by experts, all study programme parameters content, the learning outcomes, the set aims and tasks are agreed with RSU and coordinated together with RSU partner institution.

The study programme educates and trains qualified specialists for professional activities in the fields of medical engineering and medical physics with professional knowledge of the structure of medical equipment, apparatus and instruments, their physical and technical principles of operation, manufacturing technology, conditions of use and safety; develops students' practical skills for working with medical equipment – its acquisition, installation, use, adjustment and quality management, as well as improves skills for planning and monitoring the radiation technologies, patient and personnel dosimetry. The study programme also prepares the students for experimental research activities. Graduates of the study programme possessing special knowledge and competences in the field of medical technology are in demand in the labour market; they work at medical institutions – hospitals, centres providing various medical services, as well as work at representative offices of medical device manufacturers, state administration institutions (accreditation, controlling bodies).

2.1.3.

All changes focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments. Changes are approved by both partners - RTU and RSU.

2.1.4.

The programme administration claims that there are approximately 500 medical institutions in Latvia that use medical devices with ionizing radiation sources, over the years about half of the medical institutions are provided with these devices, and the graduates of the study program also work in the representative offices of medical device manufacturers (Siemens, Philips, GE), laboratories and other companies whose work is related to medical equipment. Such specialists are also required by state administrative, controlling and accreditation institutions.

2.1.5. The development and implementation of the joint study programme "Medical Engineering and Medical Physics (42526)" is justified and ensures a quality study process.

Study process, mobility of students, teaching staff collaboration are organized from both involved partners, changes are discussed, the processes managed and coordinated in collaboration of all partners.

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

The panel concludes that the with RSU joint study programme complies with the study field. The title, code, degree to be obtained, professional qualification or degree and professional qualification of the study programme, aims, objectives, learning outcomes and admission requirements are interrelated. The processes are managed and coordinated in collaboration of all partners.

Strengths:

1. Strong orientation towards research.
2. Relatively highly motivated students.
3. Uniqueness of the programme in the Baltic region.

Weaknesses:

1. Unstable outcomes of enrolment and relatively high share of drop-out students.
2. The added value of the Masters programme compared to the Bachelor programme is not clear.
3. Low number of international students.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The panel concludes that the content of the study programme is topical, the content of the study courses / modules is interconnected and complementary. The correspondence of the content to the objectives of the programme and the needs of the industry, labor market and scientific trends is clearly shown. Although there is general correspondence of the thesis topics to the spirit of the study programme, some of the topics (at least judging from the title) are quite far from its content: "Material endurance detection method using micro/nano destructions in the material", "Photo stimulated kelvin probe spectroscopy method for semiconductors" and some others. The participation of two partners is great benefit for students related to the content of joint study programme.

2.2.2. Not applicable

2.2.3.

The study implementation methods contribute to the aims and learning outcomes of the study courses and programme. Student-centred learning and teaching principles are not fully considered. The study implementation methods are agreed upon partner Universities, are appropriate. The processes managed and coordinated in collaboration of all partners.

2.2.4.

Internship is an integral part of the study programme; its goal is to develop student's professional skills and competences in a professional environment, as well as to strengthen the knowledge in accordance with the requirements included in the profession standard. Internship within the professional Master study program "Medical Engineering and Medical Physics" amounts to 6 CP. As a

result of the internship, the student should be able to develop and present the Master Thesis. For students with a Bachelor degree, the internship is intended to be 20 CP, during which the students have to develop at least 2 projects. As part of this internship, the students are required to undergo a Clinical Internship, during which they acquire basic skills in working with diagnostic and therapeutic equipment and systems at the clinic. The aim, tasks and methodological guidance for this stage of internship are provided in the "Clinical Internship Guidelines". Place of internship: diagnostic departments of medical facilities, radiation therapy department of medical facilities.

In the self-assessment report of the SP it is shown that the academic staff of the SP collaborates with professional organizations in Latvia, such as Latvian Medical Engineering and Physics Society (LMIFB), the Association of Mechanical Engineering and Metalworking Industries of Latvia (MASOC), etc., as well as international professional organizations (associations) such as the International Federation of Medical and Biological Engineering (IFMBE), European Association of Nuclear Medicine (EANM), the International Organisation for Medical Physics (IOMP), etc. The objectives and tasks of the study program are designed considering recommendations from these organizations concerning the requirements of the profession worldwide and in Europe. It is stressed that the content of the study programme reflects the development trends of the sector and ensures the training of specialists in changing socio-economic conditions. The graduates of the study programme have highly developed research skills. The content of the study programme is updated according to the trends of the sector, labour market and research development.

The internship is foreseen in the study programme; more than 30 places of potential internship are mentioned. Provision of internship in foreign language is not described in the provided documentation. Internship organization is managed from both partners.

2.2.5. Not applicable

2.2.6.

The topics of the final theses correspond to the field and the study programme.

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

The panel concludes that the content of the joint study programme is topical, the content of the study courses / modules is interconnected and complementary. The correspondence of the content to the objectives of the programme and the needs of the industry, labor market and scientific trends is clearly shown. The study implementation contributes to the aims and learning outcomes of the study courses and programme. Student-centred learning and teaching principles are not fully considered from both partners.

Strengths:

1. Well developed network of internship places.
2. Well developed collaboration network with professional organizations and companies.

Weaknesses:

1. Student centered learning is not articulated.
2. Provision of internship in foreign language is not explained.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field.

It can be seen in the self-assessment report of the study programme that it is fully supported by material facilities located at RTU Biomedical Engineering and Nanotechnology Institute (BENI). Material facilities include textbooks, methodological materials, classrooms and laboratories equipped for lectures and practical classes.

The spectrum of the equipment is broad including material and nano-object characterizing laboratory, including threshold photoelectrons and exaelectron spectroscopy, infrared and FTIR spectroscopy, FTIR ATR spectroscopy for surface analysis; XPS, Auger, SIMS spectroscopy; AFM, STEM and optical microscopy; micro and nano indentation methods; radiation dosimetry devices; biochip laboratory and others. The students of this joint study programme using all premises of the partner RSU in the same volume as by RTU. The study programme`s resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.3.2. Not applicable

2.3.3.

Most of the funding for the study programme comes from the state budget. The costs per student within the study programme, calculated by the Office of the Vice-Rector for Finance and the use of funding ensures full implementation of the study process.

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

The students have full access to all the RTU and RSU required resources, including textbooks, digital library as well as modern equipment used in the elaboration of theses.

Strengths:

1. The resources are available at the both Universities and internship partners.
2. Practical support from the professional institutions and companies.
3. Strong and unique research laboratories and well qualified research staff.

Weaknesses:

1. Relatively narrow specialised laboratories.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

The self-assessment shows that the study programme is implemented by academic staff holding a degree of Doctor of Science and highly qualified professionals with appropriate work experience. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience. The qualification of staff is highly academic and professional from both partner institutions of joint study programme. RTU and RSU involved teaching staff complies with all legislative requirements.

2.4.2.

All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments. All changes in staff composition are discussed and approved from both partners - RTU and RSU.

2.4.3. Not applicable

2.4.4.

The academic staff is active in research and publishing, each member in the last six years has publications in peer-reviewed editions, including international editions.

The RTU motivates the staff scientific activities. The same is appropriate for teaching staff involved in study programme realization from RSU.

2.4.5.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established. Mechanisms of collaboration between partners - RTU and RSU - are established.

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

The qualification of staff is highly academic and professional from both partner institutions of joint study programme. RTU and RSU involved teaching staff complies with all legislative requirements. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established. Mechanisms of collaboration between partners - RTU and RSU - are established.

Strengths:

1. Benefits from using teaching staff higher qualification of 2 leading Universities in Latvia.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Medical Physical Technology Engineer, approved on 15.12.2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-200.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

The joint study programmes comply with the requirements prescribed in Section 55.(1), Paragraphs one, two, and seven of the Law on Higher Education Institutions. Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

Well organized and structured joint study programme. Content is topical and balanced. The qualification of staff is highly academic and professional from both partner institutions of joint study programme.

Strengths:

1. The resources are available at the both Universities and internship partners.
2. Benefits from using teaching staff higher qualification of 2 leading Universities in Latvia.
3. Strong and unique research laboratories and well qualified research staff.
4. Practical support from the professional institutions and companies.

Weaknesses:

1. Relatively narrow specialised laboratories.
2. Provision of internship in foreign language is not explained.

Evaluation of the study programme "Medical Engineering and Medical Physics"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Medical Engineering and Medical Physics"

Short-term recommendations

Emphasize a student-centered learning approach

Long-term recommendations

Evaluate the possibility of provision of internship in foreign language
Evaluate the possibility to extend the specialisation of laboratories

II - "Industrial Design" ASSESSMENT

II - "Industrial Design" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Professional Bachelor study programme "Industrial Design (42548)" complies with the study field. According to the State professional standard the Industrial design engineer designs and develops industrial products (e.g. vehicles, household appliances, machinery and equipment, tools, gadgets, etc.), taking into account requirements of aesthetics and ergonomics, cooperating with industrial products manufacturing companies and the programme focuses on teaching all these aspects. The programme awards a qualification of Industrial Design Engineer.

2.1.2.

The title of the study programme, the degree to be obtained, the professional qualification, the aims, tasks, learning outcomes and admission requirements of the study programme are interrelated and correspond to the title "Industrial Design". Duration of the program is set to full-time, 4 years and volume to 160 CP.

The overall idea of combining engineering and artistic skills is good and needed for the industry. Design and ergonomic factors play a significant role in development of product competitiveness. This is especially true for consumer products, slightly less for industrial products.

The study programme as such has its justification and good development potential. According to company representatives, some improvement has taken place during the last year especially grounded on the discussions with the company representatives which reflects on the satisfaction of the students revealed from the interviews.

2.1.3.

The programme was established only in 2017 and the study programme is being developed considering the results of student surveys as well as employers' recommendations. In 2021 the general and professional specialisation study courses (5 courses) were replaced by more specialization relevant ones according to the employers and students suggestions and the field development trends.

2.1.4.

In the academic year 2020/2021, the first five students completed the study programme. On average, 20 state-funded study positions are allocated each year for the study programme. There is a positive trend observed in relation to the number of students resuming full-time studies after one or two years.

SER states that all graduates work in a speciality. The interviews with the graduates do not exactly prove this. At least 3 of 5 graduates that participated in the interview struggled to find a job in the speciality.

Interviews with employers did not give a clear message that such specialists are needed or what should be the clear difference from a mechanical or product development engineer.

2.1.5. Not applicable

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

The programme is relatively new. The first five graduates finished the studies only in 2021 and the next ones in 2022. In general, the aims and objectives of the study programme complies with the study field. There is also some economic justification behind the programme as industry has certain demand for product development specialists with engineering and artistic skills. The employment indicators of the graduates need to be improved in collaboration with the industry.

Strengths:

1. The field of industrial design as such is important and has good development potential.

Weaknesses:

1. Majority of first year graduates still are not employed in their speciality, i.e. weak collaboration with the industry sector to shape competitive programme and courses to stress the Industrial Design specifics and industry needs focusing on the local and Baltic market.
2. No positive references so far from the industry that have employed the students/graduates.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The study courses are designed in accordance with the objectives of the study programme. Meeting the needs of industry is a factor that needs to be addressed more closely and specified in more detail reflecting on the course structure too. The objective "to provide knowledge, skills and competencies an opportunity to work in design and manufacturing companies that design and / or manufacture industrial products is supported with the logical structure of the courses with the strong focus on the design and manufacture mechanical products. The second part of the objectives "conceptual design and entrepreneurship" is supported weaker. The programme complies fully with Cabinet of Ministers Regulation No 512 of 26 August 2014 "Regulations on the State Standard of the Second Level Professional Higher Education". The learning outcomes of the study programme fully meet the requirements of the occupational standard (Annex 6).

2.2.2. Not applicable

2.2.3.

Study programme includes and implements appropriate study modules. Student representatives participate in the development of the programme, its discussion and approval as revealed from the interview with the students and academic staff and the discussions showed good level student-centered teaching approach implementation on the speciality related courses.

2.2.4.

Program includes a compulsory internship, the amount of which is 20 CP. Representatives of the internship companies participate in the discussion to define the internship aims and tasks. On completion of the individual task students present the internship report and description of the results achieved. Overall evaluation of the internship is based in addition on the student performance during the internship and the employer's report. The discussions with the students revealed some problems in finding the internship placements direct connected with the specialty and in some cases the internships are more general mechanical engineering which were claimed to be

good for the deeper learning CAD skills. It was noticed by the experts during the interviews the internships will not lead to further employment of the student which is considered due to weak collaboration between the industry and the programme management as the companies does not seem to have clear understanding of the potentialities of the industrial design in the global market.

2.2.5. Not applicable

2.2.6. The topic of the final work comes from the internship or a project implementing company, as well as the topic can be chosen individually by the student or from the list of topics offered by the Department. The students interviewed demonstrated great diversity in ability to find interesting final work topics. Some students seem to need some more support from the side of the University and especially from the programme management and companies potentially interested in the design aspects of their products.

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

The content of the study programme is in line with the requirements of the professional requirements and standard. An updated version of the professional standard was officially approved during the time of evaluation, so the contents of the study process needs to be reviewed and aligned together with the companies. The programme offers a good overview of the design process, product development and respective life cycle. The students and graduates mentioned strong CAD knowledge as an advantage allowing them to work as design engineers. The technological side, however, could be improved to give a better understanding of what kind of newest and new design trends related technologies are used to produce certain types of consumer products. The use of wide range of equipment in the laboratories and Design Factory should be encouraged.

The strong side is the mandatory internship.

Strengths:

1. Organized internship.
2. The overall concept covering the whole process of product development.
3. CAD knowledge.

Weaknesses:

1. Limited practice and understanding of various production technologies, especially related to consumer products newest design trends in the world.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

Classrooms, laboratories and computer rooms, RTU Laboratory House, RTU Design Factory, as well as the resources of RTU Scientific Library and RTU ORTUS portal. Cooperation with Dizaina fabrika should be intensified to use modern equipment for creating prototypes.

2.3.2. Not applicable

2.3.3.

The programme is funded both from the state budget and from tuition fees paid by individuals. In general the resources and provision of the study program are insufficient due to the poor system of distribution of university funding for the needs of the study program. Number of students in the study program meet requirements. There is no reference to any specialty related R&D or industrial collaboration project in the Self-Evaluation Report and none of this kind of projects were mentioned during the interviews. The fact should be considered as one of the improvement needed factors at the programme which could help to improve the funding situation as well as to be a real indicator for actual need of the programme student's skills and knowledge.

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

The new campus in Kipsala has good infrastructure and laboratories and this is good support for further development of the programme. The available infrastructure should be used more actively (not just the small laser machine, 3D printer and manual tools available in the prototyping classroom). The Self-Evaluation Report and discussions revealed an urgent need for the programme development to deepen collaboration and discussions with the companies interested in the field to specify more clearly the focus the programme, to activate specialty promotional activities including teaching the companies about the potentialities of the industrial design.

Strengths:

1. Great potential of the Industrial Design field for the consumer products market.
2. Field interested entrants.

Weaknesses:

1. Weak collaboration with the interested companies.
2. Needs for programme/labs funding improvement, advisable by initiating R&D or industry collaboration projects.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

Most of the resources required to deliver the programmes are currently available. Lab basis needs improvement or more use of Design Factory resources.

2.4. Teaching Staff

Analysis

2.4.1.

The staff involved in the implementation of the programme comprise 8 professors, 3 associate professors, 10 assistant professors, 4 lecturers, 3 assistants and 1 guest lecturer. Totally 21 of them have a Dr.Sc.Ing. degree.

Staff attested to a good range of training courses provided by the institution and excellent support

from colleagues. In addition, RTU has implemented a good training programme including seminars and training in specific areas. According to the self-evaluation report (pg 72), RTU has implemented a new procedure and guidance on promotion criteria. However, of the staff interviewed many were unaware of this.

Good cooperation with other faculties has been established in attracting teaching staff.

2.4.2.

Changes in the content of the academic staff of the study programme over the years indicate a positive trend in attracting directly new academic staff, thus positively reducing the average age of academic staff.

Staff felt that they have a lot of influence over the content and that because the regular meetings provide the opportunity to discuss and review the changes. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review considers professional standards.

2.4.3. Not applicable

2.4.4.

During the accreditation visit it was stated that the Department aims for all staff to publish 2-4 articles a year and are looking to do more particularly with a younger composition of academic staff. Although not analysed for the specific staff members, the above values appear consistent with the overall number of publications in the period. The staff have limited time to attend conferences due to their portfolio of activities.

2.4.5. Academic staff from 7 RTU faculties take part in program implementation. The following measures are used to exchange experience and information related to the academic work: meetings of academic staff at least once a semester; department meetings at least once a month; Academic conference once a year; seminars, conferences, workshops, etc.

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

An enthusiastic and close team with a good mix of academic and industrial experience. Staff are artistic work active and keen to continuously develop the programme to meet near-term sovereign needs and emerging technologies. According to SAR and interviews, staff seems to be qualified. Effective cooperation with other faculties is ensured.

Strengths:

1. Integrating art and engineering creates and widens academic staff innovativeness.
2. Active artistic culture.

Weaknesses:

1. Weak involvement of the industrial people delivering courses.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Partially compliant

Comply with the professional standard of Industrial Design Engineer, valid till the new standard was adopted.

The actual professional standard of Industrial Design Engineer was approved in the process of current assessment of study field, on 08.06.2022.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-227.pdf>

The programme needs to be revised and by necessity adjusted to the recently introduced professional standard.

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex. All the teaching staff is proficient in Latvian.

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme in general fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments. The new professional standard was recently introduced (8 June 2022) and the programme needs to be adjusted.

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

This is a relatively new study programme and study area as such. According to surveys there is a certain demand for such specialists in the industry. It is, however, many times lower as demand for mechanical engineers or mechatronics engineers. The real demand is hard to assess due to the fact that the study programme is new as thus companies do not know what to expect from the graduates (all know what mechanical or mechatronics engineer means, but industrial design engineer is not so well known). The next few years will show the viability of the programme.

Most of the graduates are not working in speciality (according to the interviews). In contrast, students from other fields like mechanical engineering and mechatronics mostly are employed already starting from second course, most of them in jobs related to their speciality. Interviews with employers did not give a clear message that such specialists are needed. This is a crucial issue that needs to be addressed. Both potential employers and graduates should be interviewed to find out the gaps in knowledge to make necessary adjustments to the study process.

The concept as such seems relevant. The strong side is well developed co-operation between different faculties and departments in delivering lectures. There are good opportunities to use modern equipment for prototyping that is available in Kipsala campus, also outside Industrial design department.

Strengths:

1. New programme with development potential.
2. Good inter-faculty and inter-disciplinary co-operation in attracting teaching staff.
3. The programme offers a good overview of the design process, product development cycle.
4. The students and graduates mentioned strong CAD knowledge as an advantage.

Weaknesses:

1. Most of the first year graduates have not managed to find a job in their speciality.
2. The real demand for such specialists was unclear from the interviews with companies' representatives.
3. Need to be revised due to new professional standard.

Evaluation of the study programme "Industrial Design"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Industrial Design"

Short-term recommendations

Align the study programme with the new version of the profession standard "Industrial design engineer" (officially approved in June 2022)

Extensive consultations with industry representatives and potential employers are needed to improve the study process and employability of the graduates

Long-term recommendations

Consultations with industry representatives and potential employers are needed to adjust the programme to be more attractive and revealing the potential of the Industrial Design especially for consumer products and Latvian industry in general.

Realize teaching companies about the potentialities of the Industrial Design

II - "Engineering Technology, Mechanics and Mechanical Engineering" ASSESSMENT

II - "Engineering Technology, Mechanics and Mechanical Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Program focuses on working with CAD software in the field of mechanics and mechanical engineering (SER); not in Technology.

2.1.2.

The program title in English "Engineering Technology, Mechanics and Mechanical Engineering" does not match the corresponding title in Latvian "Inženiertehnika. mehānika un mašīnbūve" (title of SER annex "REV-Pielikums 3.1.4 MBM0_stud_statist_LV un EN). The word "mašīnbūve" in Latvian means "production of machines".

Obtained bachelor's degree in mechanical engineering corresponds to the title of the program.

2.1.3.

Program volume has been adjusted from 121 CP to 120 CP. Some courses have been excluded from the program. New courses "MTM208 Robot Kinematics" and "MEE320 Reliability of Medical Equipment" have been added to Part B, and the course "VAS038 Environment and Climate Roadmap" to part B.

2.1.4.

Graduates work as specialists in local or international companies related to specialized mechanical equipment and technologies. Graduates who want to find a job faster without pursuing a Master's degree are involved in work in the IT sector.

The number of students dropped out of the Bachelor study program is significantly higher than the number of graduates. Students studying in English ranged from 41% to 75% during the reporting period.

2.1.5. Not applicable

The study program offers very wide and comprehensive theoretical knowledge. The academic and

fundamental knowledge of the graduates is generally well perceived by the industry representatives.

- As this is an “academic program”, it lacks practical work and internships in companies.
- The program is very much oriented towards foreign students. In the bachelor program about 2/3 of the students are from abroad. In the master program only 1 local student out of 14.
- Most of the foreign students represent third countries – India, Uzbekistan, etc. Most of them leave Latvia after finishing studies, so the positive impact on Latvian industry is close to none. There is a huge deficit of qualified mechanics / mechatronics engineers in Latvia. The relatively big number of foreign students unfortunately doesn't help to solve this problem.
- There are two relatively similar programs implemented - Mechanical and Instrumental Engineering (professional bachelor) and Engineering Technology, Mechanics and Mechanical Engineering (academic bachelor). Graduates from both programs are in high demand in the industry. In most cases students start working already during study time. Consolidation of both programs should be considered to avoid duplication and increase efficiency. Potentially one even stronger programme with a higher number of students and graduates could be developed on the basis of two separate programs. This would also be easier for young potential students to choose the study program as now it is somehow misleading.
- According to the SER, the average study costs for one student is EUR 4074 per year. The annual fee for foreign students is EUR 2800 (according to the information on the web page). If so, the foreign students are subsidized. From what funds? This needs to be clarified.

According to students and graduates, more industry representatives should be involved to present trends and development from industry perspective and to give an insight into the profession. This would help the students (especially in the first years) to better understand their career prospects and what is the real application of the theoretical knowledge they are being taught.

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

Conclusions

Strengths:

1.

Weaknesses:

Not identified

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Overall the content of the study programme is topical and meets all the relevant legislative regulations and focused on the needs of the industry as specialists not engineers. One study course dealing with production - MAB205 Basics of Production Engineering, which first declared learning outcome is to collect, arrange, criticize, analyze, summarize and apply information (MBM0_CoursMapp_8_annex.pdf). The courses about Engineering technology (machinery, cutting tools, work fixtures, machining operations) not provided for academic study programme, according to the programme tasks formulated as "provide students theoretical knowledge, skills and abilities in engineering, mechanics and mechanical engineering and develop students' technical creative thinking and problem-solving skills so that the acquired knowledge can be used in the development of new techniques and technologies in various mechanical engineering sub-sectors: machine dynamics analysis, machine design, machine testing and diagnostics, robotics, mechatronics.

2.2.2. Not applicable

2.2.3.

Nearly all courses include individual work, which is most often a calculation work/course work with a computer simulation part and a creative or analysis part. Within several courses group work is also evaluated. Version of the programme which is implemented in a foreign language is identical to that which is implemented in Latvian. Student-centered teaching principles at the programme include individualization, games, and competitions.

2.2.4. Not applicable

2.2.5. Not applicable

2.2.6.

Topics can be conditionally divided into two groups: topics on classical mechanics or topics on the strength of materials and material properties. Works with a weaker practical part receive the lowest marks.

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

Overall the content of the study programme is topical and meets all the relevant legislative regulations and focused on the needs of the industry as specialists not engineers.

Strengths:

1. Provide students theoretical knowledge and technical creative thinking.

Weaknesses:

1. As this is an “academic programme”, it lacks practical work and internships in companies.

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

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

Assessment of compliance: Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. Implementation of the study courses involves the use of 3 computer classrooms equipped with computer programs such as MathCAD, MatLAB and two classrooms equipped with cameras. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. For specific courses there are dynamic testing machines as well as various equipment for sample preparation for experiments. There is a wide range of literature available in the library. Books can be easily accessed via the university's Moodle system. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the

study programme and ensuring the achievement of the learning outcomes.

2.3.2. Not applicable

2.3.3.

The study programme is financed both from the state budget funds and tuition fees. Number of students meet requirements set in SAR annex "On minimal number of students in study programmes". The SAR indicates that financial resources of the study programme are sufficient for successful implementation of the study programme and their use is regularly controlled by the administration as well as RTU Office of ViceRector for Finance.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. For specific courses is available the specific provision.

Strengths:

1. Wide range of literature available in the library.

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

The academic staff involved in the implementation of study programme is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme. Teaching staff members collaborate with specialists from industry to meet the future industry needs and to develop collaboration with industry. In the implementation of the study programme "Engineering Technology, Mechanics and Mechanical Engineering (43521)" in total of 12 lecturers joined the academic staff of the study programme during the reporting period, 9 lecturers have been elected from the department as professors and associate professors. According to the data provided in the CVs, the English language skills of the new teachers are at the B1 and B2 levels, which allows for better teaching to English speaking students.

2.4.2.

RTU follows-up and regularly improves the composition of teaching staff implementing the study

programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4.

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.5.

The academic staff forms research groups and works on national and international projects that result in joint publications and patents. Ortus courses provide insight into the course content and materials so that course material is not repeated. The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. The study programme can be implemented as studies in Latvian and English languages.

Strengths:

1. The academic staff forms research groups and works on national and international projects that result in joint publications and patents.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard"

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The Bachelor study programme "Engineering Technology, Mechanics and Mechanical Engineering" (MBM0) is an academic programme, which focuses on working with CAD computer software in the

field of mechanics and mechanical engineering. The students and graduates (local students) are demanded by the engineering sector. The programme is very much oriented towards foreign students, mostly from such countries as India, Uzbekistan, etc. The ratio between local students and foreign students is 70/153.

Strengths:

1. Provides strong theoretical knowledge, calculations and use of advanced software.
2. Most of the local students have no problem with finding job in their speciality, often they are recruited already during their study time.
3. Good quantitative results in attracting foreign students.

Weaknesses:

1. As an academic programme, no internship is foreseen, leading to less practical knowledge compared to professional bachelor programme.
2. As it is an academic programme, engineer qualification is not awarded.
3. High dropout rate (similar to other study programmes of the study field).

Evaluation of the study programme "Engineering Technology, Mechanics and Mechanical Engineering"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Engineering Technology, Mechanics and Mechanical Engineering"

Short-term recommendations

More industry representatives as guest lecturers, company visits and insight in real production already in the first study year to build up interest and motivation of the students

Review of the financing model including annual fees for foreign students

Focus should be shifted from quantity to quality regarding foreign students

Long-term recommendations

Integration with professional bachelor programme "Mechanical and Instrumental Engineering" should be considered to create stronger and more attractive study programme

The title of the programme should be reviewed (both in Latvian and English) to be more easily understandable for both local and foreign students and potential students

II - "Aeronautics and Transport Systems Engineering" ASSESSMENT

II - "Aeronautics and Transport Systems Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Graduate academic Bachelor study programme "Aerospace Systems Engineering " provides Bachelor degree in Mechanical Engineering and no qualification. The content of the academic study programme is developed and updated in accordance with Cabinet Regulation No. 240 of 14 May 2014 "Regulations on the State Standard of Academic Higher Education". In general, the study programme is appropriate for the field. The structure and duration of the study programme are appropriate. The teaching staff have stated that the taught Bachelor programme goes beyond theory, background and operation of the Bachelors degree, to provide the necessary skills and knowledge that is relevant to this aeronautical discipline.

2.1.2.

Academic Bachelor study programme "Aeronautics and Transport Systems Engineering", provides an academic degree Bachelor degree in mechanical engineering does not provide any professional qualification. This is the first (undergraduate) academic degree, Level 6 of Latvian and European Qualification Frameworks.

In SAR, the programme is declared as full time, 4 years, 160 Credit Points. Languages of instruction are Latvian and English. Admission requirements for the programme provided in Latvian are General or Vocational secondary education. The assessment of the level of English language proficiency under the requirements specified in regulatory enactments in addition implemented to be admitted to the programme provided in English.

The students acknowledged that guest lectures/seminars from industry was a benefit to the programme. It is positive to see the local aeronautical and aviation industry supporting the taught degrees. The close involvement of a local Ultralight aircraft Original Equipment Manufacturer with the degree programme is noted as being highly desirable and sustaining for the study programme in the long term. The ambition stated by the Head of Unit is to incorporate the return of space research into the unit (e.g. cube-satellites), which is considered beneficial and exciting for the programme.

2.1.3.

The corrections made to the study programme's parameters within the assessment of the study field are analyzed, justified and would be supported.

2.1.4.

The programme originates from the need for aeronautical engineering education in Latvia, to produce quality graduates for the aero and aviation transport system sector.

Due to recent international events, (e.g. COVID pandemic) the effects of such on the aeronautical and aviation sector remain unclear for Europe.

Students commented on the local opportunities in the aeronautical and aviation sector, and that they remain confident to be able to find relevant work upon graduation.

The international benchmarking initiatives of the study programme remain not very clear for administration of the programme. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities are very low (based on the Aviation Transport MGAO data) that is in 2018 (3 students) & 2019 (1 student). For Aeronautics and Transport Systems Engineering, the documentation for provided for "cooperation and internationalisation (2.5.3) does not indicate the specific programme.

2.1.5. Not applicable

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

Overall, the programme is appropriate for the field, the title, code, degree to be obtained, aims, objectives, learning outcomes and admission requirements are interrelated. Study programme is

very well designed and fully compliant with the needs of the Latvian higher educational requirement and the needs of the industry.

Strengths:

1. Very close industrial links with the aircraft manufacturing industry, and the aims to restart the space research activities.

Weaknesses:

1. A significant weakness of the programme is the loss of students year on year, particularly with the maths and physics modules. It remains unclear how the unit will remedy this regular and repeated loss of students, to ensure higher levels of student completion (e.g. the award of the degree).

2. From the managerial point of the programme no clear initiatives of international benchmarking or comparison have been found in order to monitor own progress and to focus the development of the study programme.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme content is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014. The content of the study programme is well balanced, is regularly reviewed, improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing. The content of the study programme is topical, the content of the study courses is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes, as well as meets the needs of the industry, labour market and scientific trends.

2.2.2. Not applicable

2.2.3.

The SAR states that the study programme “Aeronautics and Transport Systems Engineering” has been developed taking into consideration proposals from employers and the demand of the labour market. The graduates of the programme easily find jobs in freight and passenger transport and logistics companies. According to the forecasts of employers, the programme could produce from 20 to 50 graduates per year.

The classes and the examinations are organised to meet the possibilities and needs of the students while they combine studies with work. Students’ knowledge is assessed twice a year upon completion of courses during winter and spring examination sessions.

Examination methods, criteria and the procedure for appealing the assessment are available to the students and they are informed about it. Students are introduced to the expected learning outcomes of each course and the report form, also expected tests at the beginning of the study course. The content of the course, expected learning outcomes, and recommended literature are provided in the description of each course. The results of the study process are analysed in discussions with the head of the study programme, as well as during the meetings of the AERTI Council. The study implementation methods contribute to the achievement of the aims and learning outcomes of the study courses and the study programme. Student-centred learning and teaching principles are considered and appropriately organised.

2.2.4.

The internship at RTU is organised according to the “Procedure for Organising Internship at Riga

Technical University" approved by the RTU Senate. The scope of an internship for this study programme was 6 Credit Points. Internships are intended to be undertaken at companies, which have signed a cooperation agreement. Internship places in the respective field are provided in collaboration with the technical staff of internship companies. To support the student during the internship, the AERTI provides an internship supervisor consultant, who coordinates the internship, advises the student and solves internship-related issues with the respective company. The tasks of the internship are related to the learning outcomes achievable. The internship complies with the requirements of regulatory enactments, which is positive. The opportunities offered are broad and student lead, and clearly effective to satisfy the requirements of engagement for the degree (supported by the level of completion - MGLO_stud_statist / LTK0002_EN etc.)

2.2.5. Not applicable

2.2.6.

The topics of students' final theses are relevant to the field and correspond to the study programme. Relevant thesis, such as "Designing an alternative route for cargo deliveries from China to European Countries" are submitted and for part of the degree, which is considered very positive.

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

The study programme is highly pertinent to the objectives and requirements of the study programme. The study programme is very well designed and fully compliant with the needs of the Latvian higher educational requirement, and the needs of the industry.

Strengths:

1. The contents of the degrees are very well aligned to the study programme. This is commented by the local Aircraft OEM industry, and is therefore considered a significant strength.
2. The programme has been updated and meets the needs that support both the wider industry and the sovereign capability.
3. The inclusion of the internship in the related industries is considered to be very positive and beneficial to the students' learning and needs.

Weaknesses:

1. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities is very low.

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

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

Assessment of compliance: Not relevant

Not relevant

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Ķīpsala Campus. The overall scope of the material resources and equipment are impressive. The SAR states that RTU Ķīpsala Campus currently has a

significant number of study rooms, laboratories, special training rooms, computer classrooms, workshops and several research centres of national importance. For the implementation of the study program the in premises of the Institute of Aeronautics hereinafter - the Institute) of Riga Technical University (at Ķīpsalas Street 6B and Lauvas Street 8 in Riga), 23 study rooms and specialised study rooms, training laboratories, workshops and simulation facilities are equipped with computers, projectors, webcams, audio systems, and other technical aids. The rooms for lecturers are equipped with computers with Internet connection and printers.

The staff reported that there was an ambition in the Department to develop the programmes including digitalisation of the study provision. Unfortunately, as some of the core staff are new to the post, they were not able to identify the previous issues or the advancement that have been made since that time. Students commented that access to digital resources in the library was limited, extending from the print media to the digital access of journals and periodic searching/ viewing. The implementations of these resources for the study programme are identified as an area for improvement, by both the students, the staff etc.

The staff did not appear to be aware of the European Commission's environmental ambitions, such as FlightPath 2050 or The Master Plan which underpin the European goals for Aeronautics / Aviation. The staff did comment that their required update training has been successful in recent years, and has included newer and relevant CAD software training, and this is directly relevant to the taught programme.

However, some of the students commented that they sometimes found it difficult to access the software to conduct these activities/ assignments and were forced to use their own machines and attempt to obtain software by other means.

2.3.2. Not applicable

2.3.3.

Total funding for the programme is based upon the student numbers recruited. The majority of this budget is the state budget. Overall, student numbers have been falling since 2014 - as per Fig 1 & 2 shown in MCL0_stud_statist. Completion rates are relatively high for 20 and 21. The falling numbers is a challenge across the institution.

The students commented that the mathematics and physics classes remain a significant challenge to some of the students, which results in a large number of the students dropping out of the course at this time. The explanation given by staff and students is not fully clear as to why this is the case, or what remedial matters have been employed to remedy this anticipated repeated loss of the student cohort numbers each year.

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

Most of the resources required to deliver the programmes are currently available, from full time, external part time and guest lectures being provided.

Strengths:

1. The inclusion of industry know-how and direct involvement of the course is considered a positive.
2. The inclusion of the internship in the related industries is considered to be very positive and beneficial to the students' learning and needs.

Weaknesses:

1. Not all the students have sufficient access to library resources, IT terminals, relevant IT software etc., and are reliant on finding computing/ software etc to overcome this obstacle. The resources assigned to support the implementation of the study programme is identified as a shortcoming.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

Most of the resources required to deliver the programmes are currently available. Not all the students have sufficient access to library resources, IT terminals, relevant IT software and are reliant on finding computing/ software to overcome this obstacle.

2.4. Teaching Staff

Analysis

2.4.1.

The SAR indicates that the numbers and the composition of the teaching staff remains quite stable over the assessment period. In 2013/2014 there were 39 teachers in total, in 2021/2022 - 30 teachers. 3 out of 30 teachers are the guest teachers. The core academic faculty in numbers were the following in 2021/2022: Professors - 6, Associate Professors - 3, Assistant Professors - 15, Lectures - 3. The staffing levels appear to be sufficient on the first impression, with the department claiming to employ 56 teaching staff and researchers for the discipline. A large number of external staff from industry are invited into University to teach some of the modules to the students.

The requirement for all of the teaching staff to be in possession of a full teaching diploma is not clear, and would not be possible for external lecturers.

The junior staff members' have very high teaching loads and the personal study duties of these staff members seeking to gain their doctorate is not adequately explained, as to how the University will support their academic completion. Likewise, the department does not adequately explain academic staff retention, such as how the resourcing challenges can be improved, to reduce the chances of these junior staff members from leaving the University for other forms of employment.

A minor weakness is the staff understand of the European environmental aspects associated with aeronautical engineering/ aerospace/ aviation and transport system engineering.

2.4.2.

The unit is a small department, which is considered very complementary to support the teaching activities. The close industrial participation in the form of external experts providing guest lectures and externally hired part time lecturers was considered to be a positive feature. The students commented that they felt those aspects were really positive and helpful.

2.4.3. Not applicable

2.4.4.

The institution and faculty provide training and signposting for conferences. This was considered helpful but staff have limited time due to their portfolio of activities. The Department aims for all staff to publish 3-4 articles a year and are looking to do more particularly with a younger composition of academic staff.

However, the full time staff are very busy with high levels of teaching and student contact. Additionally, a number of the teaching staff have yet to complete their doctoral degree thesis and formally complete that process. This very high level of teaching duties coupled with staff completing their doctoral studies part time is potentially problematic, and could affect the viability of the programme - especially if the junior staff leave for another employer. The University does not

adequately explain how these staff members will satisfactorily meet their work requirements and achieve their doctoral studies in a timely manner. This is a shortcoming.

2.4.5.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. Most of the teaching resources required to deliver the programmes are currently available, from full time, external part time and guest lectures being provided.

Strengths:

1. The inclusion of industry know-how and direct involvement of the course is considered a positive.

Weaknesses:

1. The junior staff members' have very high teaching loads and the personal study duties of these staff members seeking to gain their doctorate is not adequately explained.
2. The staff low understanding of the European environmental aspects associated with aeronautical engineering/ aerospace/ aviation and transport system engineering.

Assessment of the requirement [7]

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

Assessment of compliance: Partially compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. But, the staffing levels are not adequately addressed. The use of external part time lecturing staff may or may not have the pedagogical grounding. Likewise, the very high teaching workload appears to be conflicting with the staff's ability to conduct scholarly activities.

The management does not explain how this teaching and research balance can be addressed fairly for staff members, and has implications for retention and promotion of academic staff members.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014

"Regulations on the State Academic Higher Education Standard "

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

In conclusion, the study programme overall is considered to be satisfactory.

Strengths:

1. Most of the previous evaluation assessment action items have been addressed to a satisfactory

standard.

2. The students are pleased with the taught programme and fully understand and appreciate its direct relevance to their later employment.
3. The support to the taught programme from local industry is also noted as a strength.
4. The use of industrial experts to deliver some of the taught materials is seen by the staff and students as a significant benefit, and shows the close links and relevance to employability.

Weaknesses:

1. Previous evaluation assessments have identified the need for students and staff to better participate in ERASMUS mobility activities: however, the delivery of this improvement has yet to be completed fully.
2. The supply use of the library's learning resources is likewise considered an area for development, moving away from the older Russian materials for newer and more recent relevant publications.
3. The use of the digital online resources for the study programme remains highly problematic, with some current students resorting to asking friends studying at other academic institutions' to use their digital credentials to obtain copies of journal and conference papers for RTU assignments.

Evaluation of the study programme "Aeronautics and Transport Systems Engineering"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Aeronautics and Transport Systems Engineering"

Short-term recommendations

Review the allocation of resources, specifically computer workstations or PC clusters for the student usage and the software on the stations or on the students personal laptops.

Evaluate the teaching load of junior staff who are studying for the PhDs.

Review the allocation of resources, specifically computer workstations or PC clusters for the student usage and the software on the stations or on the students personal laptops.

Long-term recommendations

Provide the digital access to the usual online learning repositories (is likewise poor), as students have cited a lack of access to the full journal sites. The students do not have full and unrestricted access to the knowledge based resources in the library.

Review and fulfil the variety and quantity of the relevant textbooks are not sufficient for student withdrawal services, or the reserve (non-removal) collection.

Revise in both expense and the ability of the interlibrary loan system, the students have cited difficulties to obtain the specialist books for the study programme modules.

Properly measure and address the number of new text books directly relevant for each study programme needs. Each taught unit should have at least one paper based text book for the module, and these books should be held in the library.

Revise the use of learning resources (including the library resources/ services) for the study programmes as a core element of the study programmes.

II - "Engineering Technology, Mechanics and Mechanical Engineering" ASSESSMENT

II - "Engineering Technology, Mechanics and Mechanical Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

According to the academic Master level study programme's "Engineering Technology, Mechanics and Mechanical Engineering" title, aim and tasks, the study results are also formulated as all skills and competencies required for a Master's degree. The study programme complies with the study field.

2.1.2.

Programme goals, learning outcomes (skills in CAD applications) are very similar to related Bachelor programme (classification code 43521). Obtained Master's degree in mechanical engineering corresponds to the title of the programme. The goal of the study programme is set as to educate and train engineers, but there is no engineers qualification to be obtained (SER, p. 422, 423). Programme focuses on working with CAD software in the field of mechanics and mechanical engineering (SER, repeated paragraphs). Duration of implementation is 2 years both for Latvian and English languages.

2.1.3.

The amount of credit points of the programme has been adjusted from 81 CP to 80 CP. The study courses "MEE412 Biomaterials" and "MTM701 Biotextiles in Engineering Area", were added to Part B of the study programme as more topical.

2.1.4.

Most graduates work at the international companies located in Latvia. Foreign students mostly find work abroad. From 2018 to 2020 students are expelled mostly after the first semester, meaning that these students do not actually start studies.

2.1.5. Not applicable

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

Overall, the study programme complies with the field and meets the national standards and requirements. All study programme's parameters are interrelated and based on students and industry needs.

Strengths:

1. Programme focuses on working with CAD software in the field of mechanics and mechanical engineering.

Weaknesses:

1. Programme does not provide the engineer qualification as set in goals.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The information provided in SAR demonstrates that the content of the academic study programme "Engineering Technology, Mechanics and Mechanical Engineering (45521)" is very similar to the related Bachelor programme (43521). The SAR annex "MMM0_CoursMapp_8_annex" shows that the programme content is topical. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The study programme content complies with national state education standard. Awarded Master's degree in mechanical engineering, corresponds to the title of the programme. Study programme prepare the specialists in calculations/simulations of processes not industry engineers.

2.2.2.

Awarded Master's degree in mechanical engineering, corresponds to the title of the programme. Awarding degree is based on the achievements and findings of the Mechanical engineering and Mechanics field of science.

2.2.3.

Nearly all courses include individual work, which is most often a calculation work/course work with a computer simulation part and a creative or analysis part. Implementation in Latvian and English languages is identical. The study implementation methods are focused on the contribution of the achievement of the study programme's goals and learning outcomes, all study methods are appropriate and well combined with the content of study courses and the study programme. Student-centred learning principles are implemented.

2.2.4. Not applicable

2.2.5. Not applicable

2.2.6.

Students can choose a topic for their Master Thesis that is relevant for a particular company. Developing a thesis, students search for information in high-quality scientific journals on the latest developments in their chosen topic based on relevant field trends and related to the study programme. The process of updating the programme is ongoing.

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

Overall the study programme is well designed and has been improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing. Student-centred learning principles are implemented.

Strengths:

1. The study programme content is topical.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

Awarding degree is based on the achievements and findings of the Mechanical engineering and Mechanics field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. The implementation of the study courses involves the use of 3 computer classrooms equipped with computer programs such as MathCAD, MatLAB and two classrooms equipped with cameras. For specific courses there are dynamic testing machines as well as various equipment for sample preparation for experiments. There is a wide range of literature available in the library. Books can be easily accessed via the university's Moodle system. A wide range of equipment is available for Part B courses.

2.3.2. Not applicable

2.3.3.

The study programme is financed both from the state budget funds and tuition fees. Number of students is appropriate, meet requirements set in SER Annex "On minimal number of students in study programmes".

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Strengths:

1. A wide range of equipment is available for Part B courses.

Weaknesses:

Not identified.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes

2.4. Teaching Staff

Analysis

2.4.1.

Specific study courses are delivered by 23 lecturers from the Department of Theoretical Mechanics and Material Resistance. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.2.

A total of 12 lecturers joined the academic staff of the study programme during the reporting period. According to the data provided in the CVs, the English language skills of the new teachers are at the B1 and B2 levels, which allows for better teaching to English speaking students. RTU follows-up and regularly improves the composition of teaching staff implementing the study programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4. Not applicable

2.4.5. The academic staff forms research groups and works on national and international projects that result in joint publications and patents. The ESF projects also involve groups of academic staff. Ortus courses provide insight into the course content and materials so that course material is not repeated. The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. The academic staff forms research groups and works on national and international projects that result in joint publications and patents. The ESF projects also involve groups of academic staff.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. The composition of the teaching staff focused on the quality of the implementation of the study programme.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard"

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The study programme complies with the requirements of the Law on Higher Education Institutions and other related requirements. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. The study programme can be implemented in Latvian and English languages.

Strengths:

1. The study programme content is topical.
2. A wide range of equipment is available for Part B courses.
3. The academic staff forms research groups and works on national and international projects that result in joint publications and patents. The ESF projects also involve groups of academic staff.

Weaknesses:

1. The goal of the study programme is set as to educate and train engineers, but there is no engineers qualification to be obtained.

Evaluation of the study programme "Engineering Technology, Mechanics and Mechanical Engineering"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Engineering Technology, Mechanics and Mechanical Engineering"

Short-term recommendations

Review the goal of the study programme

Long-term recommendations

Continue to stay in line with the science trends and needs of industry

II - "Production Engineering " ASSESSMENT

II - "Production Engineering " ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The study programme complies with the study field. Programme provides next level education within the field because the admission requirements are Bachelor degree in mechanical engineering, mechanics and metal processing, or comparable education.

2.1.2.

Duration 2 years and 80 CP provides 7th level education both in Latvian and English and promotion to PhD studies too. According to the academic Master level study programme's "Production Engineering (45521)" title, aim and tasks, the study results are formulated as all skills and competencies required for a Master's degree.

2.1.3.

Respective changes were made in the study programme "Production Engineering" (Senate Decision Minutes No 638 of 30 March 2020) and are appropriate. Modified courses placement and CP assigned.

2.1.4.

Graduates enter the labor market as highly demanded specialists, and often establish their own companies. The study programme is also internationally recognized - 30 international students enrolled within the last 3 years. Total number of students in the period from 2016 to 2021 has changed significantly from 18 to 51 (including foreign students).

In study year 2020/2021 were 33 2nd year students, graduating 15 (SAR p.202).

Tuition fees for foreign students are increased every year.

2.1.5. Not applicable

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

Overall, the study programme complies with the field and meets the national standards and requirements. All study programme's parameters are interrelated and based on students and industry needs.

Strengths:

1. Strong relations with the industry and local business.

Weaknesses:

1. High dropout level.
2. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities are very low.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study courses are updated in accordance with the development trends of the industry and respective field of science. Sequence of courses is logical. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The

content complies with national state education standard.

2.2.2.

Students search for information about the latest achievements in the field for the chosen topic. The study programme's content and composition are based on the achievements and findings of the Mechanical engineering and Mechanics field of science.

2.2.3.

Group tasks, individual tasks are set for students, schedule of lectures and examinations is developed taking into account that students are employed persons. The study implementation methods are focused on the contribution of the achievement of the study programme's goals and learning outcomes, all study methods are appropriate and well combined with the content of study courses and the study programme. Student-centred learning principles are implemented.

2.2.4. Not applicable

2.2.5. Not applicable

2.2.6.

Master Theses are mostly related to research in specific companies. Final thesis topics are initiated from industry and related to the topical trends and demand.

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

The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The content complies with national state education. Student-centred learning principles are implemented.

Strengths:

1. Group tasks, individual tasks, final thesis topics from industry.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

The study programme's content and composition are based on the achievements and findings of the Mechanical engineering and Mechanics field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. Three new scientific laboratories were set up between 2019 and 2021. Close cooperation with different institutions from RTU, LU and industrial companies (above mentioned laboratories equipped by industry support). Scientific library

next door.

Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.3.2. Not applicable

2.3.3.

The average funding from the State budget per student in 2013-2020, calculated by the Office of Vice-Rector for Finance, was EUR 6112.92.

Minimum number of students set by RTU at master's level- 19 students (annex of the SAR "On minimal number of students in study programmes").

Programme had 18-51 within the last 6 years, including 0-24 foreign students, learning in English.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Strengths:

1. Study and research laboratories significantly supported by industrial companies.

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

Seven teaching staff members have a Dr.Sc.ing. degree, one Mg.Sc.ing., PhD candidate. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.2.

Department of Mechanical Engineering and Mechatronics involved in the implementation of the study programme has increased the number of associated professors. Here are two lecturers also involved. RTU follows-up and regularly improves the composition of teaching staff implementing the study programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4.

Within the framework of the European Social Fund project "Strengthening academic staff of higher education institutions in areas of strategic specialization" teachers have improved their English language skills. The academic staff is active in research and publishing, each member in the last six years has publications in peer-reviewed editions, including international editions. The RTU motivates the staff scientific activities.

2.4.5.

System of regular academic conferences and professional development seminars to improve methodological teaching competences. The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience. The academic staff is active in research and publishing.

Strengths:

1. The RTU motivates the staff scientific activities.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard"

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The study programme complies with the requirements of the Law on Higher Education Institutions and other related requirements. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. The study programme can be implemented in Latvian and English languages.

Strengths:

1. Strong relations with the industry and local business.
2. The RTU motivates the staff scientific activities.
3. Study and research laboratories significantly supported by industrial companies.

Weaknesses:

1. High dropout level.
2. Students participation in international mobility (eg. ERASMUS+, bilateral, etc.) activities is low.

Evaluation of the study programme "Production Engineering "

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Production Engineering "

Short-term recommendations

No short-term recommendations offered

Long-term recommendations

Motivate student's participation in international mobility

Evaluate the possibility to decrease high dropout level

II - " Aerospace systems engineering" ASSESSMENT

II - " Aerospace systems engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Graduate academic master study programme "Aerospace Systems Engineering ", provides Master degree in Mechanical Engineering and no qualification. The content of the professional study programme is developed and updated in accordance with Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard". The study programme

complies with the study field.

2.1.2.

The study programme corresponds to Level 7 of Latvian and European Qualification Frameworks. In SAR, the programme is declared as full-time, 2 years, 80 Credit Points. Languages of instruction are Latvian and English.

Admission requirements for the programme provided in Latvian are Bachelor's degree in mechanical engineering or comparable education. The assessment of the level of English language proficiency under the requirements specified in regulatory enactments in addition implemented to being admitted to the programme provided in English. Adequate evidence of mapping the study courses of the programme is provided by document MGLO_CoursMapp_8_annex and supports both the learning outcomes. Likewise, the interconnections are demonstrated in the additional study programme documentation provided (zip files).

The name of the study programme was changed from Transport Systems Engineering to Aerospace Systems Engineering. The new director of the programme was appointed in 2020. The ambition stated by the Head of Unit is to incorporate the return of space research into the unit (e.g. cube-satellites), which is considered beneficial and exciting for the programme.

2.1.3.

The SAR states that since the last accreditation, the content of the study program has been updated. Speaking generally, the study programme is appropriate for the field. The structure and duration of the study programme are appropriate. The teaching staff have stated that the taught Master's programme goes beyond the theory, background and operation of the Bachelor's degree to provide the necessary skills and knowledge that are relevant to this aeronautical/aerospace discipline.

The number of students is not increasing despite the demand from employers and the labour market needs. The decision to offer the study programme in English is expected to increase the number of students admitted.

The students acknowledged that guest lectures/seminars from the industry were a benefit to the programme. It is positive to see the local aeronautical and aviation industry supporting the taught degrees: The Latvian Aviation Association and Latvian Aerospace Industry Association confirm the necessity of the program and the demand for its graduates. Employability of the program graduates is promoted by the fact that Latvia has joined the European Space Agency and the aerospace industry is developing in Latvia. Given the situation in the world, it is difficult to predict the potential demand for students, but it is clearly growing over time, and at least 20 new specialists per year would be necessary to satisfy the needs of the Latvian economy.

The close involvement of a local Ultralight aircraft Original Equipment Manufacturer with the degree programme is noted as being highly desirable and sustaining for the study programme in the long term.

2.1.4.

The programme originates from the need for aeronautical engineering education in Latvia to produce quality graduates for the aero and aviation transport system sector.

Due to recent international events (e.g. COVID pandemic), the effects of such on the aeronautical and aviation sector remain unclear for Europe.

Students commented on the local opportunities in the aeronautical and aviation sector and that they remain confident to be able to find relevant work upon graduation.

On the other hand, no clear initiatives of international benchmarking have been found in order to monitor the progress and focus on the development of the study programme.

Students participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities is very low

(based on the Aviation Transport MGAO data) that is in 2018 (3 students) & 2019 (1 student). For Aerospace Systems, the documentation provided for “cooperation and internationalisation (2.5.3) does not indicate the programme.

2.1.5. Not applicable.

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

Overall, the study programme is very well designed and fully compliant with the National legal requirements.

Strength:

1. The long-term considerations to align the research of aerospace cube satellite activities with the taught programme are considered to be a significant strength.

Weaknesses:

1. From the managerial point of the programme, no clear initiatives of international benchmarking or comparison have been found to monitor their own progress and focus on the development of the study programme.
2. Students participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities is very low.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The study programme complies with Cabinet Regulation No. 240 of 13 May 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content of the study programme is entirely relevant and topical.

2.2.2.

The Masters degree satisfies the Regulations of the Cabinet of Ministers of 13 May 2014 No. 240 "Regulations on the State Academic Education Standard" <https://likumi.lv/doc.php?id=266187>, and these are appropriately evidenced and discussed as per the supporting documentation MGL0_StEdSt_6_annex

The study programme meets all the Masters requirements, including the standards of units, as evidenced in the supporting documentation.

2.2.3.

The study courses are designed in accordance with the aim of the study programme and observing the principles included in the description of the study programme implementation. Likewise, the content of the study courses/modules is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes, as well as meets the needs of the industry, labour market and scientific trends. It fully complies with the requirements and the national regulations (state education standards, professional (occupational) standards or professional qualification requirements for engineers.

The SAR states that the study program has been improved, taking into account the results of student surveys, as well as the recommendations of employers.

Some teaching and learning methods are used to assess students' performance and ensure

mastering the program courses and acquiring practical skills – case studies, group work, problem-oriented studies, and information technology. The quality of students' knowledge, abilities and skills is constantly monitored by operational accounting of records, credit tests and exams, public presentation of the study project, internship evaluation, and evaluation of the graduation paper. The study implementation methods contribute to achieving the aims and learning outcomes of the study courses and the programme. Student-centred learning and teaching principles are considered and appropriately organised.

The 4 Credit Points internship is foreseen in the academic Master study programme. The internship is intended to achieve the following learning outcomes: skills in route planning, freight management, ability to understand logistics chains, assess environmental issues related to transportation, training skills in diagnostics, testing, repair and control of equipment, and ability to perform preventive and regulated work. The tasks of the internship are related to the learning outcomes achievable.

2.2.4.

The internship complies with the requirements of regulatory enactments, which is positive. Furthermore, the students' internship opportunities are well explained in the 'Internship_Management_Procedure' supporting documentation. The compliance with the regulatory enactments is likewise fully evidenced in the submitted materials. The opportunities offered are broad and student lead, and effective to satisfy the requirements of engagement for the degree (supported by the level of completion - MGL0_stud_statist / LTK0002_EN etc.)

2.2.5. Not applicable

2.2.6.

The topics of students' final theses are relevant to the field and correspond to the study programme. Examples of student Master thesis [3.2.6] (for 2020) include "Research into the use of alternative fuel in an international freight shipping company," "Application of Remotely Piloted Aircraft for ensuring logistical processes in Riga city," etc. The awarding of a degree is based on the achievements and findings of the relevant field of science. Students wishing to advance their master's degree and enter the doctoral study programme have clearly defined promotion (doctoral thesis defence) opportunities with potential relevant research areas in the aerospace systems engineering discipline.

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

The study programme content is highly pertinent to the objectives and requirements of the study programme.

Strengths:

1. The programme has been updated and meets the needs supporting the wider industry and the sovereign capability.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

Meets all the requirements for obtaining a master's degree and is based on the achievements and findings of the field of aeronautical engineering.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Kipsala Campus. As a consequence, the majority of classes and laboratories are now on a single site. Newly refurbished facilities are available at the Kipsala site in addition to existing facilities at Laboratory House. Additionally, various laboratory activities have been developed and funded under the framework of the European projects.

The staff did comment that their required update training has been successful in recent years and has included newer and relevant CAD software training. However, the students commented that they sometimes found it difficult to access the software to conduct these activities/assignments and were forced to use their own machines and attempt to obtain software by other means. Likewise, some students have reported they do not have sufficient access to library resources, IT PC terminals, relevant IT software etc. Students have commented that they rely on finding computing/ software to overcome this obstacle via any other means (trial software/ copy software/ fake software etc.), which remains problematic for both this and other programmes.

2.3.2. Not applicable.

2.3.3.

Total funding for the programme is based upon the student numbers recruited. The majority of this budget is the state budget. Overall, student numbers have been falling since 2014 - as per Fig 1 & 2 shown in MGL0_stud_statist. Completion rates are relatively high for 2019/20 and 21. The falling numbers are a challenge across the institution.

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

The resources assigned to support the study programme implementation are identified as a shortcoming, as per deficiencies identified stemming from low student numbers and resourcing challenges.

Strengths:

1. The student intake numbers, whilst relatively low, remain steady.

Weaknesses:

1. An identified weakness is not all the students have sufficient access to library resources, IT PC terminals, relevant IT software etc. Students rely on finding computing/software to overcome this obstacle via any other means (trial software/ copy software/ fake software etc.).

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

The digital provision is not adequately addressed regarding the students' IT support devices/software. Basic library services, materials, and technical and financial provisions remain adequate for the small number of students taught.

2.4. Teaching Staff

Analysis

2.4.1.

The staffing levels appear to be sufficient *prima facie*, with the department claiming to employ 56 teaching staff and researchers for the discipline. Some external staff from the industry are invited to University to teach some of the modules to the students. Typically these are external employees from the industry. The requirement for all of the teaching staff to be in possession of a full teaching diploma is not clear and would not be possible for external lecturers.

The staff reported that there was an ambition in the department to develop the programmes, including the digitalisation of the study provision. Unfortunately, as some of the core staff are new to the post, they could not identify the previous issues or the advancement that have been made since that time. Students commented that access to digital resources in the library was limited, extending from the print media to the digital access to journals and periodic searching/viewing.

Implementing these resources for the study programme is identified as an area for improvement by the students, the staff, etc.

The staff did not appear to be aware of the European Commission's environmental ambitions, such as FlightPath 2050 or The Master Plan, which are the basis of the forthcoming environmental legislation.

However, the full-time staff are very busy with high teaching and student contact levels. Additionally, a number of the teaching staff have yet to complete their doctoral degree thesis and formally complete that process. This very high level of teaching duties coupled with staff completing their doctoral studies part-time is potentially problematic. It could affect the viability of the programme - especially if the junior staff leave for another employer. The University does not adequately explain how these staff members will satisfactorily meet their work requirements and achieve their doctoral studies on time. This is a shortcoming.

2.4.2.

The unit is a small department, considered complementary to support the teaching activities. The close industrial participation in the form of external experts providing guest lectures and externally hired part-time lecturers was considered to be a positive feature. The students commented that they felt those aspects were really positive and helpful.

2.4.3. Not applicable

2.4.4.

Each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions (if the staff member has worked for a shorter period, the number of publications should be indicated in proportion to the period worked) or artistic achievements (e.g., exhibitions, films, theatre performances and concerts) or five years of practical experience (except for experience in the implementation of the study programme) following the Law on Higher Education Institutions. The Department aims for all staff to publish 3-4 articles a year and are looking to do more, particularly with a younger composition of academic staff. The institution and faculty provide training and signposting for conferences. This was considered helpful, but staff have limited time due to their portfolio of activities.

2.4.5.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

In conclusion, the teaching provision and standards required to deliver the programmes are currently available, from full-time to external part-time and guest lectures. However, some staff have very high teaching loads, and this reflects in the lower levels of external publications/longer PhD study times.

Strengths:

1. Including industry know-how and direct involvement in the course is considered as positive.

Weaknesses:

1. However, an identified weakness is that some of the junior staff members have very high teaching loads, and the personal study duties of these staff members seeking to gain their doctorate are not adequately explained as to how the University will support their academic completion.
2. Likewise, the department does not adequately explain academic staff retention, such as how the resourcing challenges can be improved to reduce the chances of these junior staff members leaving the University for other forms of employment.

Assessment of the requirement [7]

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

Assessment of compliance: Partially compliant

The teaching provision and standards required to deliver the programmes are currently available. External teaching staff usage is unclear (pedagogical training), junior staff members' high teaching loads and the difficulties associated with staff studying for their doctorate whilst working.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard"

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

In conclusion, the study programme overall is considered to be satisfactory. Most of the evaluation assessment action items have been addressed satisfactorily.

Strengths:

1. The students are pleased with the taught programme and fully understand and appreciate its direct relevance to their later employment. Likewise, the programme is taught to the same appropriate standards in Latvian and English to the necessary high levels.
2. Supporting the taught programme from local industry is also a strength. The use of industry experts to deliver some of the taught materials is seen by the staff and students as a significant benefit and shows the close links and relevance to employability.

Weaknesses:

1. However, some weaknesses remain unaddressed. Previous evaluation assessments have identified the need for students and staff to better participate in ERASMUS mobility activities: however, the delivery of this improvement has yet to be completed fully.
2. The supply use of the library's learning resources is likewise considered an area for development, moving away from the older Russian materials for newer and more recent relevant publications.
3. Further, the use of the digital online resources for the study programme remains highly problematic, with some current students resorting to asking friends studying at other academic institutions to use their digital credentials to obtain copies of journal and conference papers for RTU assignments.

Evaluation of the study programme " Aerospace systems engineering"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme " Aerospace systems engineering"

Short-term recommendations

Review the allocation of resources, specifically computer workstations or PC clusters for the student usage and the software on the stations or on the students personal laptops.

Evaluate the teaching load of junior staff who are studying for the PhDs.

Long-term recommendations

Provide the digital access to the usual online learning repositories (is likewise poor), as students have cited a lack of access to the full journal sites. The students do not have full and unrestricted access to the knowledge based resources in the library.

Review and fulfil the variety and quantity of the relevant textbooks are not sufficient for student withdrawal services, or the reserve (non-removal) collection.

Properly measure and address the number of new text books directly relevant for each study programme needs. Each taught unit should have at least one paper based text book for the module, and these books should be held in the library.

Revise in both expense and the ability of the interlibrary loan system, the students have cited difficulties to obtain the specialist books for the study programme modules.

Revise the use of learning resources (including the library resources/ services) for the study programmes as a core element of the study programmes.

II - "Aviation Transport" ASSESSMENT

II - "Aviation Transport" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Academic Master study programme "Aviation Transport" provides a Masters Degree in Aviation Transport and no qualifications. The content of the study programme is developed and updated in accordance with Cabinet Regulation No.240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard". The study programme complies with the study field.

2.1.2.

This is the first (undergraduate) academic degree, Levels 6 & 7 of Latvian and European Qualification Frameworks. In SAR, the programme is declared as full-time, 2 years, 80 Credit Points. Languages of instruction are Latvian and English.

Admission requirements for the programme provided in Latvian are General or Vocational secondary education. The assessment of the level of English language proficiency under the requirements specified in regulatory enactments in addition implemented to being admitted to the programme provided in English.

2.1.3.

In general, the study programme is appropriate for the field. The structure and duration of the study programme are appropriate. The teaching staff have stated that the taught Masters programme goes beyond the theory, background and operation of the Bachelor's degree to provide the necessary skills and knowledge relevant to this aeronautical discipline.

The students acknowledged that guest lectures/seminars from the industry benefited the programme. It is positive to see the local aviation industry supporting the taught degrees.

2.1.4.

The programme originates from the need for aviation university education in Latvia. In addition to the taught degree content, the Aviation course allows students to take the EASA Part 147 written examinations, record their attendance (in compliance with EASA rules) and gain practical experience in a Part 145 aircraft maintenance environment. This effectively allows students to gain both the degree and the EASA maintenance B type licence (with subsequent experience) on graduation.

Due to recent international events (e.g. COVID pandemic), the effects of such on the aviation sector remain unclear for Europe. However, the local aviation industry has stated that all the licensed graduates that approach the local airline will be recruited and employed due to the ongoing shortages of skilled and educated engineers. Likewise, one aviation company has stated that there is an annual need for graduating master's students of around 10 candidates per year. Students participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities are very low (based on the Aviation Transport MGAO data) that is in 2018 (3 students) & 2019 (1 student).

Students commented on the local opportunities in the sector and that they remain confident to find relevant work upon graduation.

2.1.5. Not applicable.

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

Overall, the programmes are designed well and comply with the EASA part 147 requirements. The long-term considerations are to retain the EASA certifications and to ensure that students attending the courses are fully encouraged to take the examinations, to support the local aviation industry.

Strengths:

1. Combines the degree with the EASA part 147 programme.
2. Strong relations with the industry and local business.

Weaknesses:

1. No clear initiatives of international benchmarking have been found to monitor their own progress and focus on the development of the study programme.
2. Students participation in international mobility (e.g. ERASMUS+, bilateral, etc.) activities are very low.
3. A minor weakness is the Part 147 element is an externally awarded licence/ recognition overseen by the Latvian CAA, and any possible deviation from EU Aviation law would result in the loss of this valuable achievement.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The study programme complies with Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content of the study programme is fully relevant and topical. The content of the study programme is fully relevant and topical. Likewise, the content of the study courses/modules is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes, as well as meets the needs of the industry, labour market and scientific trends. It fully complies with the EASA Part 147 requirements and the national regulations (state education standard, professional (occupational) standard or professional qualification requirements).

2.2.2.

Awarding a Master's degree in study programme "Aviation Transport (45525)" is based on the achievements and findings of the relevant field of science.

2.2.3.

The study implementation methods contribute to achieving the aims and learning outcomes of the study courses and the programme. Student-centred learning and teaching principles are considered and appropriately organised. The results of the study process are analysed in discussions with the head of the study program and during the meetings of the AERTI Council. The study implementation methods contribute to achieving the aims and learning outcomes of the study courses and the programme.

2.2.4.

If an internship is available during the study programme, the opportunities and provision of internships offered to students, as well as the organisation of work, are effective and often involve students' use in the local aviation hangers. The tasks of the internship are related to the learning outcomes achievable. The internship complies with the requirements of regulatory enactments, which is positive. Including the internship with the EASA 147 requirements is considered a very beneficial strength for both students and the University.

If the study programme is implemented in a foreign language, providing an assessment of the provision of internship in a foreign language, including for foreign students, has been possible. Additionally, language is considered separately and formally as part of Part 147 organisational award requirements.

2.2.5. Not applicable

2.2.6.

The topics of students' Masters theses are relevant to the field and correspond to the study

programme. Examples of recent thesis (3.2.6) include “Analysing the methods of signal processing in aircraft radars” and “Planning of inspection intervals based on test data.” Students wishing to advance their master's degree and enter the doctoral study programme have clearly defined promotion (doctoral thesis defence) opportunities with potential relevant research areas in the aircraft systems engineering discipline.

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

In summary, the programme is highly pertinent to the objectives and requirements of the study programme.

Strengths:

1. The programme has been updated and meets the needs supporting the wider industry and the sovereign capability.
2. Additionally, the inclusion of the internship elements of the degree with the external requirements of the EASA licence elements is considered very positive and supplemental.
3. Student access to live aircraft changes, as European law requires, is well considered and addressed.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

Awarding a Master's degree is based on the achievements and findings of the relevant field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1

The overall scope of the material resources and equipment is impressive. The SAR states that RTU Ķīpsala Campus currently has 54 study rooms, 187 laboratories, 19 special training rooms, 10 computer classrooms, 12 workshops and several research centres of national importance. For the implementation of the study program, the premises of the Institute of Aeronautics hereinafter - the Institute) of Riga Technical University (at Ķīpsalas Street 6B and Lauvas Street 8 in Riga), 23 study rooms and specialised study rooms, training laboratories, workshops and simulation facilities are equipped with computers, projectors, webcams, audio systems, and other technical aids. The rooms for lecturers are equipped with computers with Internet connection and printers. The staff did not appear to be aware of the European Commission's environmental ambitions, such as FlightPath 2050 or The Master Plan. The staff did comment that their required update training has been successful in recent years and has included newer and relevant CAD software training. However, the students commented that they sometimes found it difficult to access the software to conduct these activities/ assignments and were forced to use their own machines and attempt to obtain software

by other means.

The staff reported that there was an ambition in the department to develop the programmes, including the digitalisation of the study provision. Unfortunately, as some of the core staff are new to the post, they could not identify the previous issues or the advancement that have been made since that time. Students commented that access to digital resources in the library was limited, extending from the print media to the digital access to journals and periodic searching/ viewing. The implementation of these resources for the study programme are identified as an area for improvement by the students, the staff, etc.

2.3.2. Not applicable

2.3.3.

Total funding for the programme is based on the student numbers recruited. The majority of this budget is the state budget.

The SAR indicates that the financial resources of the study program are sufficient for the successful implementation of the study program. Their use is regularly controlled by the administration and RTU Office of ViceRector for Finance. The number of study places is allocated after negotiations with the Ministry of Education and Science. However, this positive point regarding financial resources contradicts relatively low (or non-competitive) teachers' salaries and very high teaching workloads. Student admission numbers appear to vary year by year, with 2017 peaking with over 40 admissions. However, in 2019 and 2020, admissions remained lower, between 15-20 students per year.

Completion rates appear relatively steady, and it is pleasing to see that in 2020 the completion rate almost doubled.

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

Most of the resources required to deliver the programmes are currently available. The lack of digital resources (including library), relevant software, and computing remains problematic.

Strengths:

1. Including industry know-how and direct involvement in the course is considered a positive. Student numbers appear steady.

Weaknesses:

1. An identified weakness is that not all the students have sufficient access to library resources, IT terminals, relevant IT software etc., and are reliant on finding computing/ software to overcome this obstacle.
2. The resources assigned to support the implementation of the study programme is identified as a shortcoming.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

Most of the resources required to deliver the programmes are currently available. The lack of digital resources (including library), relevant software, and computing remains problematic.

2.4. Teaching Staff

Analysis

2.4.1.

The SAR indicates that the teaching staff's numbers and composition remain quite stable over the assessment period. In 2013/2014, there were 31 teachers in total, and in 2021/2022 – 37 teachers. 6 out of 37 teachers are guest teachers. The core academic faculty numbers were the following in 2021/2022: Professors – 10, Associate Professors – 4, Assistant Professors – 11, Lecturers – 4, Assistants – 2. The staffing levels appear to be sufficient prima facie, with the department claiming to employ 56 teaching staff and researchers for the discipline. Many external staff from the industry are invited to University to teach some of the modules to the students. Typically these are external employees from the industry, such as Air Baltic. The requirement for all the teaching staff to have a full teaching diploma is unclear and would not be possible for external lecturers.

2.4.2.

The unit is a small department, considered complementary to support the teaching activities. The close industrial participation in the form of external experts providing guest lectures and externally hired part-time lecturers was considered to be a positive feature. The students commented that they felt those aspects were really positive and helpful.

2.4.3. Not applicable

2.4.4.

The Department aims for all staff to publish 3-4 articles a year and is looking to do more, particularly with a younger composition of academic staff. The institution and faculty provide training and signposting for conferences. This was considered helpful, but staff have limited time due to their portfolio of activities.

However, the full-time staff are very busy with high teaching and student contact levels.

2.4.5.

Additionally, a number of the teaching staff have yet to complete their doctoral degree thesis and formally complete that process. This very high level of teaching duties coupled with staff completing their doctoral studies part-time is potentially problematic. It could affect the programme's viability – especially if the junior staff leave for another employer. The University does not adequately explain how these staff members will satisfactorily meet their work requirements and achieve their doctoral studies promptly. This is a shortcoming.

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

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry. Identified weaknesses are junior staff members' high teaching loads and difficulties in academic completion and potential staff retention.

Strengths;

1. Including industry know-how and direct involvement in the course is considered as positive.

Weaknesses:

1. An identified weakness is that the junior staff members have very high teaching loads, and the

personal study duties of these staff members seeking to gain their doctorate are not adequately explained as how the University will support their academic completion.

2. The department does not adequately explain academic staff retention, such as how the resourcing challenges can be improved to reduce the chances of these junior staff members leaving the University for other forms of employment.

Assessment of the requirement [7]

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

Assessment of compliance: Partially compliant

Overall, the academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme. Identified weaknesses are junior staff members' high teaching loads and difficulties in academic completion and potential staff retention.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 240 of 13 May 2014 "Regulations on the State Academic Higher Education Standard"

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

In conclusion, the study programme overall is considered to be satisfactory. Most of the evaluation assessment action items have been addressed to a satisfactory standard.

Strengths:

1. The students are pleased with the taught programme and fully understand and appreciate its direct relevance to their later employment. The support to the taught programme from local industry is also a strength.
2. The use of industry experts to deliver some of the taught materials is seen by the staff and students as a significant benefit and shows the close links and relevance to employability.

Weaknesses:

1. Previous evaluation assessments have identified the need for students and staff to better participate in ERASMUS mobility activities: however, the delivery of this improvement has yet to be completed fully.
2. The supply use of the library's learning resources is likewise considered an area for development, moving away from the older Russian materials for newer and more recent relevant publications.
3. Further, using the digital online resources for the study programme remains highly problematic, with some current students resorting to asking friends studying at other academic institutions to use their digital credentials to obtain copies of journal and conference papers for RTU assignments.

Evaluation of the study programme "Aviation Transport"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Aviation Transport"

Short-term recommendations

Review the allocation of resources, specifically computer workstations or PC clusters for the student usage and the software on the stations or on the students personal laptops.

Evaluate the teaching load of junior staff who are studying for the PhDs.

Long-term recommendations

Provide the digital access to the usual online learning repositories (is likewise poor), as students have cited a lack of access to the full journal sites. The students do not have full and unrestricted access to the knowledge based resources in the library.

Review and fulfil the variety and quantity of the relevant textbooks are not sufficient for student withdrawal services, or the reserve (non-removal) collection.

Revise in both expense and the ability of the interlibrary loan system, the students have cited difficulties to obtain the specialist books for the study programme modules.

Properly measure and address the number of new text books directly relevant for each study programme needs. Each taught unit should have at least one paper based text book for the module, and these books should be held in the library.

Revise the use of learning resources (including the library resources/ services) for the study programmes as a core element of the study programmes.

II - "Heat Power and Thermal Engineering" ASSESSMENT

II - "Heat Power and Thermal Engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The professional Master study programme "Heat Power and Thermal Engineering" is the only one in Latvia that educates and trains graduates with a Master degree in heat power and thermal engineering. The content of the professional study programme is developed and updated in accordance with Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education". The study programme is the only one in Latvia. The Masters programme has been made compliant with the new qualification of LQF/EQF Level 7 of Leading Engineer in Heat Power and Thermal Engineering. The study programme complies with the study field.

2.1.2.

The structure and duration of the study programme are appropriate and fully compliant. Various programme forms are available to suit circumstances and previous degrees (clear admission requirements are set). These range for 1 year and 6 months to months to 2 years and 6 months and 60CP to 100CP respectively. Learning outcomes are satisfied and extended multiple times throughout the programme. Admissions requirements for all variants have been approved by RTU Senate.

Programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The content, the learning outcomes, the set aims and tasks of the study courses

comply with the learning outcomes, the set aims and tasks of the study programme. The programme was updated in 2021 to comply with the 2021 occupational standard. The standard was agreed at the Tripartite Cooperation Sub-council of Vocational Education and Employment meeting on 11 August 2021, <https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-172.pdf>. The updated version of the occupational standard of leading engineer in heat power and thermal engineering was approved on 9 February 2022 (<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-218.pdf>) during the process of accreditation. During the visit was confirmed that compliance with the new professional standard is assured. This work is ongoing. During the accreditation visit there was discussion around the suitability of the programme title and the need to balance programme content relevant to near-term sovereign needs and the long-term climate change agenda covering issues of sustainability and green technologies.

Staff stated that the Masters programme goes beyond theory, background and operation (Bachelors) to provide skills and knowledge to drive improvement, optimisation and new technologies. Students that continued to Masters also stated that the additionality was more about in-depth technical understanding and skills. This is consistent with the aim and content of the study programme.

Jointly delivered with colleagues from Civil Engineering. Evidence of regular course reviews and updates and regular meetings to discuss minor changes to content. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review also considers professional standards.

2.1.3.

Since 2021, a number of changes have been made to the study programme. These include the inclusion of the compulsory course MKI350 "Quality Systems (Basics)"; IUE466 "Economics of Energetics"; and MSE705 "Internship (specializing)" - 80CP variant only; and four new elective courses: BO426 "Planning and Organization of Building Construction"; BSG361 "Heat Transfer in Building Constructions"; and BSG357 "Planning of the Infrastructure in the Towns".

2.1.4.

The programme originates from the sovereign requirement for centralized heating systems (district systems) which is unique to Latvia and requires specialist graduates. Latvia is constructing a number of power plants based on combined gas and steam cycles. These include: 26 bio /food waste power plants - 1MW to 6MW); 40 gas and 70 biomass. Graduates focus on either design and planning of new systems, execution of construction or operation of installed assets. The course supports all three streams.

Government analysis of the numbers for the nation are 150 specialists in total. Until this year, the target for the course is to graduate 10 each year to meet the ongoing and increasing needs. The recent conflict and changes in the region are likely to drive an increase in the numbers required to ensure independence. The department are visiting schools and recruitment events to increase the intake for 2022 and beyond. Such outreach and recruitment activities could also be performed in conjunction with the Alumni / industry.

A number of the staff work part time in industry and these links are used in combination with lectures from past graduates. Last year there were 5+ guest lecturers. When interviewed, students stated that they enjoyed the guest lectures and would like additional ones, particularly from entrepreneurs and start-ups in the area and / or operating in the energy sector. Students were aware of such companies in Latvia but have no interaction or courses related to these aspects.

Students commented on limited graduate opportunities and that their areas of growth were in renewables and alternative energies and related sectors such as marine. Consequently, it would be very beneficial for the course to reflect these aspects. The consensus of current students was that this would also make the programme more attractive to prospective students.

2.1.5. Not applicable

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

Overall, the programmes are well designed and have been improved and updated to meet new national standards. The process of updating the programme is ongoing. There are two interrelated areas for longer-term consideration. These concern the programme title and the need for the programme to comprise content that meets the near-term sovereign needs and the long-term climate change agenda covering issues of sustainability and green technologies.

Strengths:

1. Strong relations with the industry and local business.
2. Continuous improvement of programme content and opportunities presented by the new National standard.

Weaknesses:

1. Programme title is not contemporary and nor does it reflect the climate change/renewables agenda.
2. No clear initiatives of international benchmarking have been found in order to monitor own progress and to focus the development of the study programme.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Study programme is compliant with the requirements of Paragraphs 7 and 8 of Cabinet Regulation No. 512 of 26 August 2014. Learning outcomes are satisfied and extended multiple times throughout the programme. The programme was updated in 2021 to comply with the new 2021 occupational standard. The new standard was agreed at the Tripartite Cooperation Sub-council of Vocational Education and Employment meeting on 11 August 2021, the updated version of the occupational standard of engineer in heat power and thermal engineering was approved. .

Recent changes to standards and construction guidelines require graduates to have relevant certificates in construction. As a consequence courses in building heat transfer, town planning and site management have been incorporated into the Masters programme. In 2020 a new study course MSE704 "Information and Automated Management Technologies of Energy Companies (Study Project)" was also introduced.

While the Department has a number of international collaborations (Lithuania and Japan) and uses these to understand state-of-the-art and competitors, and guide the development of the programme, none of the students interviewed had been involved in any international exchanges. The main reason/barrier was cited as holding a part time job.

While the programme includes a module on (non-standard) alternative energy sources covering solar, fuel cells, greater attention should be given to new and emerging technologies. This desire to be exposed to and taught state-of-the-art was reinforced by all students interviewed. Data shows that the course on alternative energy is one of the most popular elective units in the faculty with 70+ students.

The Department works closely with industry and past Alumni - with many Alumni holding managerial roles in industry. Two of the Alumni interviewed are studying for PhDs so have greater interaction with the Dept. Others would be happy to support the institute but have limited time. If they were to interact with the institution, it needs to be mutually beneficial. One Alumni has supervised projects and given some guest lectures.

Employers praised graduates from RTU concluding that they bring knowledge and expertise that are relevant to the local needs and optimisation of the legacy and new systems. Employers provide opportunities for excursions and fully support the institution in this regard. Employers also provide scholarships and prizes.

A number of employers have been involved in a review of the programme conducted a year or so ago, and worked with RTU on standards. In accord with students, employers are keen that the programme comprises a greater consideration of sustainability.

2.2.2.

In addition to extending learnings associated with subfields, the MSc programme includes courses on town planning and building construction, optimization and quality systems. The Masters programme includes a project/theses that must include aspects of modelling and data analysis, economic evaluation, technology evaluation process improvement for a complex problem. This is entirely appropriate for a Professional Master programme providing significant additionality (extended learning) over the Bachelors and satisfying LQF/EQF 7.

Students of the professional Master study programme are offered opportunities to participate in the annual RTU Students' Scientific and Technical Conference; they are also invited to participate in the annual RTU International Scientific Conference.

2.2.3.

Programme includes a range of practical/lab work within the courses. During the accreditation visit staff stated that 20% was the target for the amount of practical work. Students felt that the first year was very theoretical and that the high mathematics content can contribute to many students losing motivation and ultimately leaving the programme.

The SP report states that student centric learning is implemented in a number of specific units (MSE428 and MSE384) but the specific details of 'what' and 'how' are not fully reported.

In order to accommodate international students, the Department uses courses from the Mechanical Engineering Department that are taught in English. This is an area that the Department is seeking to address over the next few years. Student-staff ratio is 10:1. So a very small cohort and staff work closely with students to teach, support and mentor them.

2.2.4.

The Master study programme, depending on its variant, provides internship for 6, 12 or 32 weeks in the appropriate volume of CP. Internships are provided in accordance with Cabinet Regulation No. 51 of 26th August 2014. Students are required to maintain a diary of their internship logging the experience, training and work done. For the 60CP internship placements are formally reported and presented by students to a committee. A range of internships are made available to students but students can find their own if they wish. Interviews with the students during accreditation revealed that some students felt that a single internship can limit opportunities and that a number of shorter internships at a couple of organizations operating in different areas would be beneficial.

2.2.5. Not applicable

2.2.6.

Topics of final theses/dissertations provided in the self-assessment report (pg 411) are relevant to the field and appropriate for the study programme. These titles listed relate largely to characterising and optimising current heat and power systems. In accord with other comments relating to this study programme, the titles do not reflect more contemporary topics associated with climate change and state-of-the-art e.g. renewables.

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

The programme content is well balanced and has been updated recently and is already broad taking both a systems and operational perspective. It is clear that a balance needs to be sought between programme content that supports sovereign capability (near term) and that links to the future addressing emerging green/sustainable technologies.

Strengths:

1. Strong industrial links and input from industry.

Weaknesses:

1. Relatively few units delivered in English / reliance on the ME department to deliver units in English.
2. Dissertation topics could be expanded to cover contemporary topics such as renewables, nuclear etc.

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

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

Assessment of compliance: Fully compliant

Awarding degree is based on the achievements and findings of the Mechanical engineering and Mechanics field of science.

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Kipsala Campus. As a consequence, the majority of classes and laboratories are now on a single site. Newly refurbished facilities are available at the Kipsala site in addition to existing facilities at Laboratory House. During the reporting period ~€ 240k has been invested in new equipment. Alongside this, various laboratory activities (~40) have been developed and funded under the European projects framework.

The Staff reported that digital and physical resources are refreshed throughout the year with the self-evaluation report highlighting 50+ new textbooks purchased during the period. Alumni observed that much of the material (books) were based on Russian technologies and materials, and that a far greater proportion of international material/resources are needed to reflect the state-of-the-art and new technologies. This is partially mitigated by the recent textbooks but 'refresh and updating' should continue apace.

In contrast to books, students commented on the relative lack of availability and access to the latest software for design and operation of plant. The students also highlighted a lack of modules that teach these tools and their principles.

Access to standards is limited to computers in the library. During the accreditation visit, students stated that it would be helpful if these could be made more widely available, particularly given the transition to hybrid/distributed working.

2.3.2. Not applicable

2.3.3.

Total funding for the programme has fallen to €40k for 20/21. The majority of this budget is the state budget.

Overall numbers have been falling since 2014. Completion rates are relatively high at 54% Masters. Intake for 2021 is quite low (~6). The falling numbers is a challenge across the institution. Students also expressed concerns about the falling numbers and suggested that greater attention to the green agenda and alternative energies would help mitigate this.

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

In general, the study programme's resources, material, technical and financial provision are currently available for implementation of studies. Resources for the study programme have been improved over recent years and further update and refresh - particularly of books, software and software and access to standards is needed.

Strengths:

1. Significant and ongoing investment has been made in laboratories.

Weaknesses:

1. Resources and access to resources appear limited and in some cases are based on out-of-date technologies.
2. Greater resources should be provided for standards and non-standard (international) energy generation technologies/approaches.

Assessment of the requirement [6]

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

Assessment of compliance: Partially compliant

The study programme's resources, material, technical and financial provision are currently available for implementation of studies. Further improvement to be made to books, standards and software and access to standards is needed.

2.4. Teaching Staff

Analysis

2.4.1. The age distribution of the current staff is with two professors in the +60's, 2 doctor academics in their 40's and 2 to 3 junior doctor academics in their 30's. Whilst the range of staffing is acceptable, it will be important for RTU to retain and promote all the junior members of staff, in addition to attracting new replacements to ensure the taught course provision. Overall numbers of teaching staff have reduced slightly over the reporting period from 12 (13/14) to 9 (21/22). 67% of teaching staff hold doctorates while all staff bring specialisms (inc. practical) relevant to the study programme.

Staff attested to a good range of training courses provided by the institution and excellent support from colleagues. In addition, RTU has implemented a good training programme including seminars and training in specific areas. According to the self-evaluation report (pg 72), RTU has implemented a new procedure and guidance on promotion criteria. However, of the staff interviewed many were unaware of this.

2.4.2.

They are a small department, and this lends itself to team teaching. The collaboration with Civil Engineering ensures that the right expertise and knowledge can be given to the programme. This also provides some redundancy.

Staff felt that they have a lot of influence over the content and that because they are a small department the regular meetings provide the opportunity to discuss and review the changes. There is a formal process for approving any changes that includes review and feedback from colleagues in the Department. Part of this review considers professional standards.

2.4.3. Not applicable.

2.4.4.

The Department contributed to the production of two new national standards last year (20/21). During the accreditation visit it was stated that the Department aims for all staff to publish 3-4 articles a year and are looking to do more particularly with a younger composition of academic staff. Although not analysed for the specific staff members, the above values appear consistent with the overall number of publications in the period. The institution and faculty provide training and signposting for conferences. This was considered helpful but staff have limited time to attend conferences due to their portfolio of activities.

2.4.5.

This is a jointly in mutual cooperation of the teaching staff in the implementation organized study programme. There are related programmes in Civil e.g., HVAC but this joint programme is about integrated systems with a distinct focus on smaller scale power generation. Teaching and thesis are supervised by colleagues from both faculties. A joint seminar programme (pg 151 self-assessment report) has been initiated. Joint supervising of the final year projects and periodic meetings demonstrates strong collaboration and team working of the academic staff.

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

An enthusiastic and close team with a good mix of scientific and industrial experience. Staff are research active and keen to continuously develop the programme to meet near-term sovereign needs and emerging technologies.

Strengths:

1. Joint programme leverages the benefits/strengths of both departments.
2. Active research culture.

Weaknesses:

1. Senior staff are rapidly approaching retirement.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has

appropriate educational level, academic experience and practical experience. Greater than 67% of instructors hold a scientific degree.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with the professional standard of Heat Power and Thermal Engineering Leading Engineer, approved on 09.02.2022.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-218.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

Overall the programmes are well designed and have been improved and updated to meet new national standards. The process of updating the programme is ongoing. Underlying all the assessment areas are two interrelated areas. The first concerns the programme title and if/whether it adequately reflects the taught content. The second concerns the balance of the content of the study programme aimed at meeting the near-term sovereign needs (constraints) and the long-term (opportunities) associated with sustainability and green technologies.

Strengths:

1. The programme is unique to Latvia and accordingly has long-standing, deep relations with the industry and local business.
2. Ongoing process of laboratory refurbishment and 'updating and refresh' of books and software.
3. Jointly between two departments realized programme leverages the benefits/strengths of both departments.
4. Active research culture.

Weaknesses:

1. Programme title is not contemporary and nor does it reflect the climate change/renewables agenda.
2. Relatively few units delivered in English / reliance on the ME department to deliver units in English.
3. Few, if any, students and staff have been involved in international exchanges.
4. Dissertation topics could be expanded to cover contemporary topics such as renewables, nuclear etc.
5. Senior staff are rapidly approaching retirement

Evaluation of the study programme "Heat Power and Thermal Engineering"

Evaluation of the study programme:

Good

2.6. Recommendations for the Study Programme "Heat Power and Thermal Engineering"

Short-term recommendations

Consider modifying programme titles to include heat and power systems which may better reflect the focus of the programme – production to consumption.

Staff appeared unaware of the new requirements for promotion. Local training / dissemination events should be held by the institution to brief staff.

Department should review the software tools and teaching/training with these tools with the aim of ensuring that the software is up-to-date and representative of the industry.

Explore opportunities to involve Alumni in the programme via mentoring activities, guest lectures (could be online) and advisory boards.

Several Alumni reflected on poor communication and lecturers not turning up and there being no communications about this. This was on the more general units rather than the direction specific units.

Increase the number of modules delivered in English. This will likely be attractive to international students.

There are a number of guest lecturers from industry, and these could be increased to supplement modules and anchor material in industrial cases early on in the course (years 1 and 2).

Long-term recommendations

One of the most popular modules related to alternative energy systems. Similar units could be introduced for other disciplines. The programme team might also consider additional units that relate to the green agenda and the future.

Continually review opportunities for education and training in regard to Nuclear and monitor government priorities.

Opportunities to grow the scientific research activities should be considered alongside changes to the programme that reflect the green agenda and emerging technologies.

Given the support from employers, explore opportunities to host joint events/talks at High Schools to help recruitment.

II - "Automotive Transport Engineering " ASSESSMENT

II - "Automotive Transport Engineering " ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Professional Master level study programme "Automotive Transport Engineering" (47525) complies with study field as next step for improvement of scientific qualification in Automotive Engineering/Automotive Transport Engineering after Bachelor's degree.

2.1.2.

The duration and scope of the study programme are set according to unified requirements for study programs (URSP) approved at the RTU Senate meeting on November 21, 2016 (Protocol No. 604). The degree to be obtained and the professional qualification correspond to the 7th level of the European Qualifications Framework (EQF).

The entry requirements for the Master programme require prior technical or engineering education. With bachelor degree in engineering the Masters programme give enough technical knowledge for the graduates to work as engineers in production sector and contribute to innovation process. Thus, the qualification could be called "engineer" not "specialist".

2.1.3.

In accordance with the URSP and standard PS-183 of the profession Automotive and Heavy Vehicles

Specialist developed in 2021, the significant number of study courses are introduced and modified within some recent years.

Due to these modifications the dropped out students can easily resume their studies by relearning only the full range of research in road transport.

2.1.4.

Practically all Master's students are already employed in the profession. Dropout on average varies from 10 to 20% per year, maximum 40%. The employers praised the additional technical and project skills of Masters students and that it positioned them for more senior roles.

Industry needs road transport professionals and the university (RTU) needs postgraduate researchers to continue their doctoral studies.

The graduates are mostly employed by state institutions and semi-governmental organisations. The biggest employer - "Road Traffic Safety Directorate" (CSDD). Other potential areas of employment that were mentioned are related to road safety, investigation of road incidents, insurance companies, car dealers. Production / engineering sector is not among the main employers of the graduates.

2.1.5. Not applicable

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

Overall the study programme is well designed and has been improved and updated to meet new national standards. All study programme`s parameters are interrelated and based on students and industry needs.

Strengths:

1. High demand for graduates in Automotive industry.
2. Industry representatives involved in Master's theses review and defense.
3. Option of relearning only the full range of research in road transport.

Weaknesses:

1. High students dropout.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Programme`s content is structured and courses developed to comply with requirements of related legislative requirements and the professional standard "Automotive and Heavy Vehicle Specialist". This standard was developed with close assistance of the Confederation of Employers.

Graduates have the ability to independently formulate and critically analyze professional and scientific problems in road transport and vehicle engineering.

2.2.2.

Awarding a degree to large extent is based on the study course Research in Road Transport that provides knowledge and skills for the analysis, planning and implementation of professional and scientific research, scientific articles, theses, research reports and opinions.

2.2.3.

Some study courses are implemented in the form of modules.

At enrollment previous experience in the specialty is discussed with each student individually and according to this the choice of optional courses is provided.

Student complaints and appeals are properly investigated. Student-centred learning and teaching principles are considered.

2.2.4. The internship is organized in the first and second semester in the amount of 3 credit points. Students combine work with studies to complete an internship.

2.2.5. Not applicable

2.2.6. The topics of the final thesis include topical issues that correspond to the guidelines for the development of transport.

Students choose the topic of the master's thesis from the list offered by the Department of Automotive Engineering, but students also have the right to choose the topic of the thesis independently, based on his or her interests.

Students' final thesis often present the knowledge gained during the study, copy transcripts and images from information sources.

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

The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The content complies with national state education standard and professional standard to obtain the professional qualification. The study programme content is regularly reviewed, improved and updated to meet the actual national requirements and standards. The process of updating the programme is ongoing. Student-centred learning principles are implemented.

Strengths:

1. Final thesis are industry oriented
2. At enrollment the choice of optional courses is provided.

Weaknesses:

1. Final theses sometimes do not have enough scientific research.

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

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

Assessment of compliance: Fully compliant

Awarding degree is based on the achievements and findings of the Mechanical engineering and Mechanics field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field. The new Laboratory House, the next door RTU library with annual purchase of latest books, the provision of the information base is sufficient for the development of the study program. There is also a local library at the Department

of Automotive Engineering.

The new building was equipped with two auditoriums, a laboratory for automotive electrical equipment, which was used for the development of master's theses, a laboratory for automotive construction and mechanics, a laboratory for vehicle repair and a student projects.

2.3.2. Not applicable

2.3.3.

Funding for the study programme comes from the state budget, annually calculated by the Office of the Vice-Rector for Finance. The costs per student within the study programme gradually increases.

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

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Strengths:

1. Good and available facilities in the new Laboratory House.

Weaknesses:

1. For the significant development of the study programme it is necessary to look for additional funds.

2. Need of attracting various private funds to maintain the proper functioning of the study programme.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes

2.4. Teaching Staff

Analysis

2.4.1.

The qualification of the teaching staff complies with the conditions for the implementation of the study programme. Here are those involved in the implementation of the study program - 1 professor, 2 associate professors, 1 assistant professor, 3 practical assistant professors, 2 lecturers, 1 researcher. Doctoral degrees have 4 of them and 6 a master's degree. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.2.

RTU follows-up and regularly improves the composition of teaching staff implementing the study programme. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments. Due to the very minimal funding, it is almost impossible to attract young teachers. Nevertheless, in recent years 4 new lecturers have been involved.

2.4.3. Not applicable

2.4.4.

Each member of the academic staff in the last six years has published some articles. Information about publications in SER Annexe MTAF_publik.xlsx. The academic staff forms research groups and works on national and international projects that result in joint publications and patents. The ESF projects also involve groups of academic staff.

2.4.5.

Work of different lecturers in lectures and practical or laboratory work is practiced.

Mutual cooperation is getting better due to the new and compact location of department. Very difficult to determine the exact ratio of the number of students and lecturers as many lecturers work part-time. The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

The qualifications of the academic staff members and the involvement of the academic staff in research projects are on a good level. Staff is running industrial training courses and keen to continuously develop the programme to meet the future industry needs and to develop collaboration with industry. In general, ensured all conditions for the implementation of the study programme.

Strengths:

1. Highly qualified staff: Doctoral degrees have 4 of teaching staff and 6 a master's degree.

Weaknesses:

1. Due to the very minimal funding, it is almost impossible to attract young teachers.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to

develop collaboration with industry

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Specialist in Road Transport and Heavy Vehicles, approved on 13.10.2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-183.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are in Latvian and comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on

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

The study programme complies with the requirements of the Law on Higher Education Institutions and other related requirements. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. High demand for graduates in Automotive industry.
2. Industry representatives involved in Master's theses review and defense.
3. Option of relearning only the full range of research in road transport.
4. Final thesis are industry oriented

Weaknesses:

1. High students dropout.
2. Need of attracting various private funds to maintain the proper functioning of the study programme.
3. Due to the very minimal funding, it is almost impossible to attract young teachers.

Evaluation of the study programme "Automotive Transport Engineering "

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Automotive Transport Engineering "

Short-term recommendations

No short-term recommendations offered

Long-term recommendations

Evaluate the possibilities to cooperate and attract graduates from PhD programme "Transport" to improve the teaching staff qualification

Evaluate the possibility to decrease high dropout level

II - "Railway engineering" ASSESSMENT

II - "Railway engineering" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The professional Master study programme "Railway Engineering" complies with the study field.

2.1.2.

The identification code of the professional Master study programme "Railway Engineering" Education Classification Code - 47526. According to the professional Master level study programme's "Railway engineering (47526)" title, aim and tasks, the study results are also formulated as all skills and competencies required for a Master's degree. Graduates of the study programme are awarded Level 7 professional Master degree according to the European Qualifications Framework (EQF) and Level 5 of professional qualification according to the Latvian Qualifications Framework (LQF) in Railway Transport and Railway Technology Engineer.

2.1.3.

The major changes have been made to adjust the programme. Different (totally 10) study programme forms introduced. Some study courses were removed, some courses were replaced with newly created courses to ensure compliance with the profession standard.

2.1.4.

About 200 specialists are needed over the next five years (Prog Dirs and Employers). A new professional standard (National) has been created and the master's programme has been updated accordingly. Standard is consistent with EU standard and other standards are also covered e.g., India.

All employers spoke highly of the graduates and employ a small number of graduates each year. They particularly commended the theoretical basis and practical skills/knowledge.

Graduates praised the breadth of the programme (systems perspective) and range of industry experts.

Graduates commented on the need for the programme to include EU and international perspectives, not just Latvian.

Students raised a lack of lectures in English.

Employers suggested that the programmes include greater attention to new technologies.

Students have had little to no interaction with the institution. But, they would be prepared to return and support the institution.

Employers have a lot of interaction but there is no explicit mechanism/forum to help shape the curriculum. Employers commended the additional research and practical skills of the Masters students.

2.1.5. Not applicable

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

Overall, the study programme complies with the field and meets the national standards and requirements. All study programme's parameters are interrelated and based on students and industry needs.

Strengths:

1. Breadth of the programme.

Weaknesses:

1. Too much study programme forms.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

Programme`s content is structured and courses developed to comply with requirements of related legislative requirements and the professional standard. This standard was developed with close assistance of the Confederation of Employers. The content of the study programme is topical. The content of the study programme is in line with the requirements of the professional requirements and standard. Courses meet the needs of the industry, labour market and scientific trends.

2.2.2.

Students are able to develop and submit to publication a scientific paper on the problem to be studied or patent application for its solution additionally to the Master Thesis. The study programme`s content and composition, the degree obtained are based on the achievements and findings of the Mechanical engineering and Mechanics field of science.

2.2.3

Study programme implementation process is well organized. Student-centred learning principles are implemented (students). Course feedback forms are completed by students and their perspective is that the feedback is listened to and changes are made. Some teaching staff highlight changes made in response to student feedback at the start of their course. For practical / workshop skills - students use laboratories. First year is largely theoretical. Practical aspects increase in the next years.

Student project work - mix of industry-led and fundamental research. Students can choose their own topic. Many are involved in industry already and will have an idea of a topic driven by their experience. Each academic will also have a list of topics for students to choose.

Students agreed with staff. Students can choose their orientation/direction between rolling stock, infrastructure and overall systems.

2.2.4.

Although not explicit, the staff work with students to match internship and master`s work.

According to RTU guidelines for development of the study courses, the content, requirements and methods of assessment for study programme in English for foreigners is an identical version of the programme offered in Latvian.

2.2.5. Not applicable

2.2.6.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

The content of the study programme is topical. The study programme complies with the requirements of the Law on Higher Education Institutions and other related requirements. The content of the study programme is well balanced, designed to meet the needs of the industry, labour market and scientific trends.

Strengths:

1. Students can choose their own final work topic.
2. Each academic will also have a list of topics for students to choose.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

Awarding of degree is based on the achievements and findings of the Mechanical engineering and Mechanics field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

Availability and quality of Learning resources provide learning outcomes.

Students agreed that the resources were adequate and, in some cases, very good. Additional videos of lectures and laboratory activities would be beneficial.

The resources are described in the part of analysis of study field. Moodle e-learning environment is used. The teaching staff is provided with Zoom and Microsoft Teams video conference platforms. The Scientific Library of RTU provides the necessary information. Classrooms equipped with advanced presentation equipment. Laboratory works usually are held in the specialized laboratories. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

Computing facilities and software are available and up-to-date e.g. Fusion.

2.3.2. Not applicable

2.3.3. Basic financing is provided by state budget funded seats. The number of state funded seats is regulated by the Law on Higher Education, Paragraph 51 and Paragraph 52. The program is also financed from the tuition fees of local and foreign students.

The minimal number of students in the study programme in order to ensure cost effectiveness of the study programme is regulated and adequate.

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

The study provisions comply with conditions for study programme implementation and ensures the achievement of the learning outcomes of the study programme.

Strengths:

1. Facilities are up-to-date.

Weaknesses:

1. Risk of unpredictable change of the number of students.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme`s resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

The academic staff involved in the study programme implementation is highly qualified. 11 members of the academic staff from the Transport Institute are involved in implementation of the study programme: 1 professor, 3 associate professors, 3 assistant professors, 1 assistant and 3 researchers. 8 of them are Dr.Sc.ing and 3 Mg.Sc.ing.

To keep up-to-date trendlines in science and research all staff are involved in research activities.

General training for teaching across RTU covering online and F2F and group learnings are organized. Mentoring is not a formalised process.

Monthly meetings provide a forum for discussing changes to courses and content.

2.4.2.

All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments. Teaching staff is comparatively young -1 is in the age group of 20-30 years old, 4 - 30-40 years old, 6 - 40-50 years old, 1 - 50-60 years old, and none - in the 60+ group.

2.4.3. Not applicable

2.4.4.

The academic staff is active in research and publishing, each member in the last six years has publications in peer-reviewed editions, including international editions. The RTU motivates the staff scientific activities. All staff publish at least one paper every two years. RTU has an active seminar programme. All staff teaching load was/is between 4 and 8 hours a week.

2.4.5.

The manage of the programme and matters such as quality, integration etc. by combination of industry needs/strategy combined with student feedback. A review of the course has resulted in a change of sequencing and inclusion of rolling stock. Meeting with staff suggested limited wider knowledge of overall programme.

The cooperation of the teaching staff is formed in the meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff of the Department of Railway Engineering, discussing various issues.

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

Teaching staff composition comply with requirements for implementation of the Master's programme. The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

Strengths:

1. All staff is involved in research activities.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The academic staff is highly qualified, ensures all conditions for the implementation of the study programme and development of the programme to meet the future industry needs and to develop collaboration with industry.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Railway Technology Engineer, approved on 13.10.2021.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-185.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

The content, the learning outcomes, the set aims and tasks of the study courses comply with the learning outcomes, the set aims and tasks of the study programme. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments.

Strengths:

1. Breadth of the programme.
2. Students can choose their own final work topic.

Weaknesses:

Not identified

Evaluation of the study programme "Railway engineering"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Railway engineering"

Short-term recommendations

No short-term recommendations offered

Long-term recommendations

Continue to stay in line with the science trends and needs of industry

II - "Medical Engineering and Medical Physics" ASSESSMENT

II - "Medical Engineering and Medical Physics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

The panel concludes that the programme "Medical Engineering and Medical Physics (47526)" complies with the study field.

2.1.2.

According to the self-assessment document provided by the Study Programme, the professional Master study programme "Medical Engineering and Physics" admits students with a professional Bachelor degree in Medical Physics and a qualification of Engineer in Medical Physical Technology or a 2nd level professional higher education based on mechanical engineering, electrical engineering, computer management and computer science, obtained after at least four years of studies, or equivalent education. Most of the Master students are graduates of the same professional Bachelor study programme. However, each year about 2 students are matriculated with a Bachelor degree in physics or equivalent. Upon graduation, students obtain the professional Master degree in Medical Physics and the qualification of Engineer in Medical Physical Technology.

The study programme educates and trains qualified specialists for professional activities in the fields of medical engineering and medical physics with professional knowledge of the structure of medical equipment, apparatus and instruments, their physical and technical principles of operation, manufacturing technology, conditions of use and safety; develops students' practical skills for working with medical equipment – its acquisition, installation, use, adjustment and quality management, as well as improves skills for planning and monitoring the radiation technologies, patient and personnel dosimetry. The study programme also prepares the students for experimental research activities. The duration of the study programme is 1 year or 2 semesters with 40 credit points. For applicants with a Bachelor degree in Physics, Chemistry (or equivalent), the duration is 2 years or 4 semesters with 80 credit points. Graduates of the study programme possessing special knowledge and competences in the field of medical technology are in demand in the labour market; they work at medical institutions – hospitals, centres providing various medical services, as well as work at representative offices of medical device manufacturers, state administration institutions (accreditation, controlling bodies).

The programme administration claims that there are approximately 500 medical institutions in Latvia that use medical devices with ionizing radiation sources, over the years about half of the medical institutions are provided with these devices, and the graduates of the study program also work in the representative offices of medical device manufacturers (Siemens, Philips, GE), laboratories and other companies whose work is related to medical equipment. Such specialists are also required by state administrative, controlling and accreditation institutions.

2.1.3.

There have been some corrections made to the Study Programme. All changes focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.1.4.

Although the number of enrolled students varies from year to year, it stays in the range from 13 (year 2021/2022) to 23 (year 2013/2014). The number of graduates, however, is substantially smaller (from 4 to 11). Despite this the graduation % is one of the highest in the Faculty. Although the panel got the feeling that the graduates find their jobs in the respective branch of industry, the Study Programme did not provide any track records of the Alumni.

The study programme prepares students for PhD studies in terms of skills and knowledge. It is less clear about the additionality of a masters over a bachelors.

2.1.5. Not applicable

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

The panel concludes that the programme complies with the study field. The title, code, degree to be obtained, professional qualification or degree and professional qualification of the study programme, aims, objectives, learning outcomes and admission requirements are interrelated.

Strengths:

1. Strong orientation towards research.
2. Relatively highly motivated students.
3. Uniqueness of the programme in the Baltic region.

Weaknesses:

1. Unstable outcomes of enrolment and relatively high share of drop-out students.
2. The added value of the Masters programme compared to the Bachelor programme is not clear.
3. Low number of international students.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The panel concludes that the content of the study programme is topical, the content of the study courses / modules is interconnected and complementary. The correspondence of the content to the objectives of the programme and the needs of the industry, labor market and scientific trends is clearly shown. Although there is general correspondence of the thesis topics to the spirit of the study programme, some of the topics (at least judging from the title) are quite far from its content: "Material endurance detection method using micro/nano destructions in the material", "Photo stimulated kelvin probe spectroscopy method for semiconductors" and some others.

2.2.2.

The awarding of a degree is based on the achievements and findings of the relevant field of science.

2.2.3.

The study implementation methodes contribute to the aims and learning outcomes of the study courses and programme. Student-centred learning and teaching principles are not fully considered.

2.2.4.

Internship is an integral part of the study program; its goal is to develop student's professional skills and competences in a professional environment, as well as to strengthen the knowledge in accordance with the requirements included in the profession standard. Internship within the professional Master study programme "Medical Engineering and Medical Physics" amounts to 6 CP. As a result of the internship, the student should be able to develop and present the Master Thesis. For students with a Bachelor degree, the internship is intended to be 20 CP, during which the students have to develop at least 2 projects. As part of this internship, the students are required to undergo a Clinical Internship, during which they acquire basic skills in working with diagnostic and therapeutic equipment and systems at the clinic. The aim, tasks and methodological guidance for this stage of internship are provided in the "Clinical Internship Guidelines". Place of internship: diagnostic departments of medical facilities, radiation therapy department of medical facilities.

In the self-assessment report of the SP it is shown that the academic staff of the SP collaborates with professional organizations in Latvia, such as Latvian Medical Engineering and Physics Society (LMIFB), the Association of Mechanical Engineering and Metalworking Industries of Latvia (MASOC), etc., as well as international professional organizations (associations) such as the International Federation of Medical and Biological Engineering (IFMBE), European Association of Nuclear Medicine (EANM), the International Organisation for Medical Physics (IOMP), etc. The objectives and tasks of the study program are designed considering recommendations from these organizations concerning the requirements of the profession worldwide and in Europe. It is stressed that the content of the study programme reflects the development trends of the sector and ensures the training of specialists in changing socio-economic conditions. The graduates of the study programme have highly developed research skills. The content of the study programme is updated according to the trends of the sector, labour market and research development.

The internship is foreseen in the study programme; more than 30 places of potential internship are mentioned. Provision of internship in foreign language is not described in the provided documentation.

2.2.5. Not applicable

2.2.6.

The topics of the final theses correspond to the field and the study programme.

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

The panel concludes that the content of the study programme is topical, the content of the study courses / modules is interconnected and complementary. The correspondence of the content to the objectives of the programme and the needs of the industry, labor market and scientific trends is clearly shown. The study implementation contributes to the aims and learning outcomes of the study courses and programme. Student-centred learning and teaching principles are not fully considered.

Strengths:

1. Well developed network of internship places.
2. Well developed collaboration network with professional organizations and companies.

Weaknesses:

1. Student centered learning is not articulated.
2. Provision of internship in foreign language is not explained.

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

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

Assessment of compliance: Fully compliant

The awarding of a degree is based on the achievements and findings of the relevant field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

The resources are described in the part of analysis of study field.

It can be seen in the self-assessment report of the study programme that it is fully supported by material facilities located at RTU Biomedical Engineering and Nanotechnology Institute (BENI). Material facilities include textbooks, methodological materials, classrooms and laboratories equipped for lectures and practical classes.

The spectrum of the equipment is broad including material and nano-object characterizing laboratory, including threshold photoelectrons and exaelectron spectroscopy, infrared and FTIR spectroscopy, FTIR ATR spectroscopy for surface analysis; XPS, Auger, SIMS spectroscopy; AFM, STEM and optical microscopy; micro and nano indentation methods; radiation dosimetry devices; biochip laboratory and others. The study programme's resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.3.2. Not applicable

2.3.3.

Most of the funding for the study programme comes from the state budget. The costs per student within the study programme, calculated by the Office of the Vice-Rector for Finance and the use of funding ensures full implementation of the study process.

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

The students have full access to all the required resources, including textbooks, digital library as well as modern equipment used in the elaboration of theses.

Strengths:

1. Possibility to use the resources available at the partner university (Stradins University) due to joint Bachelor's study programme and internship partners.
2. Practical support from the professional institutions and companies.

3. Strong and unique research laboratories and well qualified research staff.

Weaknesses:

1. Relatively narrow specialised laboratories.

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme`s resources, material, technical and financial provision is fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

The self-assessment shows that the study programme is implemented by academic staff holding a degree of Doctor of Science and highly qualified professionals with appropriate work experience. The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.4.2.

The ratio of professionals related to the industry has dropped from 30% to 15% in the last 4 years, which is explained by not sufficiently attractive funding provided by RTU.

The ratio of teachers younger than 50 years is fluctuating currently reaching 30% which is quite low. The proportion of teaching staff with PhD degree has reached 100% in 2019/2020 and remains at 85% in 2020/2021, which is positive news from the point of view of quality of the SP. All changes in the composition of the teaching staff focused on the quality of the implementation of the study programme and the compliance of the study programme with the requirements specified in regulatory enactments.

2.4.3. Not applicable

2.4.4.

The academic staff is active in research and publishing, each member in the last six years has publications in peer-reviewed editions, including international editions.

The RTU motivates the staff scientific activities.

2.4.5.

The cooperation of the teaching staff is formed in meetings of the methodological commissions, in individual talks with the director of the study programme, in the talks with the teaching staff, as well as in the joint meetings of the teaching staff. A mechanism for mutual cooperation of the teaching staff in the implementation of the study programme has been established.

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

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

Strengths:

1. Strong focus on the industry professionals.
2. Motivated staff in scientific research activities.

Weaknesses:

Not identified

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members of the study programme is in compliance with the requirements specified in regulatory enactments. Each teaching staff member has appropriate educational level, academic experience and practical experience.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Fully compliant

Programme is compliant with the requirements of Cabinet Regulation No. 512 of 26 August 2014 "Regulations on the State Standard of Second Level Professional Higher Education"

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

Assessment of compliance: Fully compliant

Programme is compliant with professional standard of Medical Physicist, approved on 12.08.2020.

<https://registri.visc.gov.lv/profizglitiba/dokumenti/standarti/2017/PS-142.pdf>

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

Overall the study programme is well designed and has been improved and updated to meet new national standards. All study programme's parameters are interrelated and based on students and industry needs.

Strengths:

1. Strong orientation towards research.
2. Relatively highly motivated students.
3. Uniqueness of the programme in the Baltic region.
4. Motivated staff in scientific research activities.

Weaknesses:

1. Unstable outcomes of enrolment and relatively high share of drop-out students.
2. The added value of the Masters programme compared to the Bachelor programme is not clear.
3. Low number of international students.

Evaluation of the study programme "Medical Engineering and Medical Physics"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Medical Engineering and Medical Physics"

Short-term recommendations

Emphasize a student-centered learning approach
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Long-term recommendations

Evaluate the possibility of provision of internship in foreign language

Evaluate the possibility to extend the specialisation of laboratories

II - "Transport" ASSESSMENT

II - "Transport" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

Doctoral study programme "Transport" is a full time study, provided in Latvian as well as English languages. In general, the aims and objectives of the study programme complies with the study field.

2.1.2.

The duration of the programme is set to 4 years with an amount of 192 Credit points. The study programme corresponds to Level 8 of European and Latvian Qualification Frameworks. Admission requirements are as follows: Master degree in transport or mechanics and mechanical engineering, or comparable education. Master degree in engineering science of transport and traffic or mechanical engineering or comparable education. The assessment of the level of English language proficiency under the requirements specified in regulatory enactments. Doctor study programme "Transport" provides a degree of Doctor of Science (Ph.D.) in Civil and Transport Engineering. PhD study program "Transport" corresponds to Level 8 of EQF (European Qualification Framework) and LQF (Latvian Qualification Framework).

2.1.3.

The SAR states that 3-4 students obtain a PhD degree annually, however during the on site meetings with the representatives the large number of dropouts was identified, eg. the 2 graduates in 2021 out of 12 students enrolled in 2017. The high employment rate among the programme graduates is seen as the strength of the programme. The graduates work at higher education institutions, in the private sector or at different public entities both in Latvia and abroad. A shortcoming that is identified are the students that drop out of the doctoral programme, and thus are unable to complete their research degree.

2.1.4.

The programme is aimed at providing the renovation of the transport branch infrastructure as well as at educating potential employees for higher education institutions and scientific research institutions. As a result of the study programme students know and understand the most topical scientific theories and facts related to mechanics, engineering and transport and communication.

Research is conducted and PhD theses elaborated in the specialisation fields related to entrepreneurship, business development and innovation, quality process, product, and system maintenance in transport systems.

2.1.5. Not applicable

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

The doctoral study programme "Transport" (51525) is pertinent to the objectives and requirements of the study programme. Whilst the programme provides a high quality of education, the retention of students onto the programme remains problematic.

Strengths:

1. High employment rate among the program graduates is considered a strength.

Weaknesses:

1. High numbers of drop-outs is considered as drawback.

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The doctoral study programme's "Transport (51525)" content is fully relevant and topical. Learning outcomes are satisfied and extended multiple times throughout the programme. Aviation-related companies or others are the employers of graduates, so study courses are developed in accordance with that. Topics are listed on page 349 of SER. The study courses are interconnected and complementary, correspond to the objectives of the programme and ensures the achievement of learning outcomes. The self-assessment report is "light" on the details of the engineering achievement. The description of the programme implementation that would be conducted in English is not adequately addressed or elaborated in self-assessment report (SAR, SER).

2.2.2.

The research is conducted in specialist fields, such as entrepreneurship, business development and innovation, quality processes, and product and system maintenance in transport systems. The award of the degree is based on the achievements in aforementioned fields. The programme meets all the doctoral requirements, including the standards of units, as evidenced in the supporting documentation.

2.2.3.

Supervising professors organize discussions, debates, group work, case studies, independent work (e.g., report writing) and simulations. Students take part in the development of the programme. Annual attestation of PhD students is organized. In SER, there is no additional information regarding the implementation of the programme in foreign languages, during the visit mentioned that the study quality, organization and processes are provided at the same higher level for both - foreign and local students.

The study implementation methods are focused on the contribution of the achievement of the study programme's goals and learning outcomes, all study methods are appropriate and well combined with the content of study courses and the study programme.

2.2.4. Not applicable.

2.2.5.

The documentation provides details of the four stages on the way to obtaining the PhD degree are proposed to students, as per the self assessment evaluation (3.2.3), and these are considered appropriate and fully relevant to a successful doctoral research programme. RTU motivates and supporting doctoral students by elaborating the final thesis, research activities, publications and participating in conferences and seminars.

2.2.6.

The topics of students' final theses require interdisciplinary research in engineering sciences, economics and entrepreneurship are pertinent and fully appropriate to their respective fields of study. However, the self-assessment report does not provide a comprehensive detailed explanation/overview of the high level engineering aspects that the other study programmes have submitted, highly interdisciplinary approach are demonstrated.

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

The doctoral study programme "Transport (51525)" has a very strong interdisciplinary focus. The study programme's content is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes. Students are supported by the programme and adequate measures are implemented to ensure that processes are followed and fairness in progression in the doctoral promotion is ensured.

Strengths:

1. High level of interdisciplinarity of the study programme programme and study courses.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

The award of the degree is based on the achievements in respective field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Kipsala Campus. As a consequence, the majority of classes and laboratories are now on a single site. Newly refurbished facilities are available at the Kipsala site in addition to existing facilities at Laboratory House. Alongside this, various laboratory activities have been developed and funded under the European projects framework. 23 study rooms, training laboratories, workshops and simulation facilities are equipped with computers, projectors, webcams, audio systems, and other technical aids. RTU Scientific Library is available to anyone interested. Informative provision is supported for young researchers.

2.3.2.

The research facilities observed are considered to be excellent, appropriate and fully capable to extend the current state of the art in the respective research fields. 21 workshops and laboratories are available under the strict supervision of the respective laboratory managers. The department closely collaborates with Aviatest, Latvia's leading research company in the field of aeronautics. The good and broad framework of RTU cooperation with other scientific institutions and higher education institutions in the doctoral study programme implementation and research activities provide very positive field for students for achieving learning and research outcomes.

2.3.3.

Majority of the study programme funding comes from the State budget (96% as average), 4% from foreign and local students. Some of the research is externally funded via research projects (such as Horizon 2020/ Horizon Europe), this is considered a significant strength and evidenced. This ensures that the research is well funded and ensures adequate resources are assigned accordingly. The statistics of student enrolment (3.1.4 ref: MDT0_stud_statist) indicates that the first year enrolment between 2014 to 2020 was between 8 to 13 students per year. The number of graduating students however is much lower, with 4 in 2017, 2 in 2018, 3 in 2019, 2 in 2020, and this poor completion rate will have a measurable funding effect on the programme as a whole.

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

The laboratories and resources assigned to support the implementation of the doctoral programme is identified as a strength. Informative provision is supported for young researchers. The good and broad framework of RTU cooperation with other scientific institutions and higher education institutions in the doctoral study programme implementation and research activities provide very positive field for students for achieving learning and research outcomes.

Strengths:

1. Wide range and number of laboratories.

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme resources and science provision meet all the requirements and provisions including the achievement of the learning outcomes.

2.4. Teaching Staff

Analysis

2.4.1.

The qualification of the teaching staff members involved in the implementation of the doctoral study programme "Transport" complies with the requirements for the implementation of the study

programme and the requirements set forth in the regulatory enactments, and it enables the achievement of the aims and learning outcomes of the study programme and the relevant study courses. Eight teaching staff members are the experts of the Latvian Council of science. All of them are in field Engineering and Technology (annex LZP ekspertu saraksts_List of LCS experts_Transport.pdf). However, none of the teaching and research staff appear to be specialists in the Transport field (the requirement states at least three in Transport are required). Furthermore, the table in SER, p. 349 does not adequately demonstrate compliance, which is a shortcoming, that not affects the general evaluation of study programme.

2.4.2.

The qualitative value of academic staff has increased since 2013, with particular emphasis on the increase in the number of assistant and associate professors, which is considered as a positive aspect.

2.4.3.

In the SAR, the outputs of the teaching staff remains unclear as there is declared annex with a full list of publications for teaching staff of doctoral study programme, only for teaching staff in general for all study field. Whilst the University claims for all staff to publish 3-4 articles a year, the evidence of this is not clearly presented and adequately explained. The annex MTAF_proj._LV_EN.xlsx and MTAF_publik..xlsx demonstrate the impressive list of the publications, patents, projects and results of scientific activities of the teaching staff over the reporting period. Not clearly about the PhD programme 51525 "Transport" probably because of higher level of interdisciplinarity of the study programme. The lists in annexes convincingly points out the high level and serious approach to the scientific side of teaching staff at RTU.

2.4.4.

As mentioned before, from the list in annex follows that each member of the academic staff in the last six years has published in peer-reviewed editions, including international editions and this fact has good impact on doctoral study programme.

2.4.5.

The mutual cooperation elements of the teaching staff in the implementation of the study programme has been established, it ensures the achievement of the aims of the study programme and the interconnection of study courses. For example, the study programme conducts joint meetings of AERTI and Transport Institute academic staff, which is considered as a positive aspect.

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

In summary, the expertise of the staff is mostly appropriate to the field and focus of the research themes. Staffing levels are seen to increase since 2013, which is highly advantageous. Despite the fact, that some of the publication activities are not clearly described, the impressive list of the publications, patents, projects and results of scientific activities of the teaching staff over the reporting period points out the high level and serious approach to the scientific development of teaching staff at RTU.

Strengths:

1. High expertise levels of the staff.
2. Serious approach to the scientific development of teaching staff.

Weaknesses:

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in scientific research and projects are on a good level.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments

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

In conclusion, the study programme overall is considered to be satisfactory. Most of the previous evaluation assessment action items have been addressed to a satisfactory standard. It is possible to implement the study programme in all declared implementation options. High level and serious approach to the scientific development of teaching staff at RTU positively impacts the doctoral students.

However, the very small number of students graduating each year, even though most have completed the programme. Likewise, student retention rates and the very small number of annual doctoral completions remains too small, and this requires additional support by the staff in the unit and the University.

Strengths:

1. High employment rate among the programme graduates.
2. Interdisciplinarity of programme and courses.
3. Wide range and number of laboratories.

Weaknesses:

1. High student dropout rate.

Evaluation of the study programme "Transport"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Transport"

Short-term recommendations

Evaluate the possibility to recruit students who are appropriately motivated to complete the whole programme. Enrol only the best and most motivated students.

Long-term recommendations

Review all staff CV and experience fields of specialisation. Ensure the fields of transport are better described in more convincing detail. Latterly update the required documentation to demonstrate better compliance.

Implement annual student research reviews meetings, to highlight any difficulties and to permit a remedy to any barriers that would prevent the student completion.

II - "Mechanical Engineering and Mechanics" ASSESSMENT

II - "Mechanical Engineering and Mechanics" ASSESSMENT

2.1. Indicators Describing the Study Programme

Analysis

2.1.1.

In the Fall semester of 2021, the approbation of the newly created doctoral study programme Mechanical Engineering and Mechanics was started. The content of the doctoral study programme is developed and updated in accordance with legislative regulations and requirements. The panel concludes that the programme "Mechanical Engineering and Mechanics (51526)" complies with the study field.

The programme was started in the Fall semester of 2021 and it prepares specialists on the level of Doctor of Science (Ph.D.) in Mechanical Engineering and Mechanics or Materials Science, or Medical Engineering, or Environmental Engineering and Energy, or Nanotechnology. This four years programme complies fully to Regulation of Cabinet of Ministers No. 1001 from 27.12.2005. "Procedure and Criteria for Awarding a Doctoral Degree".

2.1.2.

The aim of the study programme (Mechanical Engineering and Mechanics (51526) is to implement higher-level studies that prepare doctors of science who are highly qualified specialists in such fields of engineering and technology as "Mechanical Engineering and Mechanics," "Materials Science," "Medical Engineering" and "Environmental Engineering and Energy" in the sub-sector "Thermal energy" with an understanding of the latest scientific theories and knowledge, systemic thinking and skills for work in engineering and high-tech companies that are able to solve research and innovation tasks (Self Evaluation Report, p.583) on the doctoral level. Therefore the study programme covers all the study field except Aviation, Aeronautics, Automotive, Railway Transport and Mechatronics and Industrial Design sub-fields. The reason is that the last mentioned sub-fields lower lever study programmes are either only on Bachelor level or oriented only to professional training and not direct for preparation for academic career. Despite this fact the programme absorbs implicitly the sub-fields preparation not directly mentioned as the aim of the programme. The last was confirmed during the interviews with the doctoral students and graduates as well as with the Head of the Programme.

Degree awarded has 5 options - Dr.Sc.ing. in Mechanical Engineering and Mechanics, or Materials Science, or Medical Engineering, or Environmental Engineering and Energy, or Nanotechnology.

The study programme provides an opportunity to prepare doctors of engineering who can work in Latvian and foreign companies in various fields and in universities, research institutions, and other organisations where research knowledge, skills, and competencies are required. The volume of the programme and the total duration of studies are the same for students with different previously acquired education: 192 CP - for full-time studies - for students with a master's degree in engineering. The programme is open to applicants with an academic and professional master's degree in engineering in the relevant field.

2.1.3.

As stated in SAR, the study programme was introduced in September, 2020, the Study Quality Commission of the Academic Information Center decided on licensing the programme as result of merging two earlier doctoral level programmes and started in the Fall semester of 2021. The corrections to the study programme's parameters within the assessment of the study field was not made.

2.1.4.

The study programme was developed by combining the existing doctoral study programmes "Engineering Technology, Mechanics and Mechanical Engineering" and "Production Engineering."

There are no graduates in the study programme "Mechanical Engineering and Mechanics" yet, though the program is designed to improve the quality of education in the previous doctoral study programs. One student in the study programme "Mechanical Engineering and Mechanics" is enrolled in the first year for studies in Latvian and two students for studies in English. One student is enrolled in the 3rd year of the programme, resuming studies from the study programme "Production Engineering" and one student has been transferred to the 3rd year from the doctoral study programme " Engineering Technology, Mechanics and Mechanical Engineering ". Analyzing the previous doctoral programmes too ("Engineering Technology, Mechanics and Mechanical Engineering" and "Production Engineering.") the enrollment on the doctoral programme at the Faculty diminished expect only a minor increase compared to year 2019. Only 4 doctoral students graduated in the year 2021 and all together 8 students graduated during the last 5 years (Self Evaluation Report p.589). The Self Evaluation Report states that "the number of students in the program is considered to be average and sufficient to provide quality training." (p.589), but this should be considered insufficient for the sustainability of the academic regrowth for the Faculty. It can be noticed from the Self Evaluation Report that all the enrolled students 2020 were self-financed or international students and the number of state budget financed students is diminishing rapidly. Interviews with the graduates and doctoral students confirmed that there is no common scheme at the Faculty to finance the doctoral students from research projects or to employ them in the Faculty. Many graduates the experts interviewed are working in companies outside the RTU though as a positive indication most of them were delivering some lectures for the students thus retaining their academic potential. Also the doctoral students and graduates admitted that bigger financial support for doing their research, buying equipment and supporting attending international conferences and seminars could help to improve the studies quality and speed up their graduation.

The Industry demand is not high at the time of the evaluation, and the motivation of the students is considered to be "mixed" with some students being highly motivated and capable, and yet some being less enthusiastic at the time of the interview. Many students work part time and undertake high teaching loads limiting time for research/scientific activities. Eight doctoral students were interviewed and were unanimous that they performed a greater proportion of teaching activities and / or part time work.

The majority of the eight doctoral students interviewed had published extensively with a number of publications in progress.

2.1.5. Not applicable

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

The study programmes have clearly defined aims which are in accordance with the Latvias' and regional development policy and real needs of the industry. The Management and developed managerial documents show good potential for the study field and programmes. All stakeholders are

positive about the study programme and respective need for the specialists. The study programme complies well with the countries' and industries' development plans and trends and clearly satisfies the need for the programmes.

Strengths:

1. Well developed and planned idea to combine 5 programme's variations under one study programme.
2. Compliance with RTU comprehensive strategic plan for the years 2021-2025.
3. Well documented and defined academic principles in respective documents.

Weaknesses:

Not identified

2.2. The Content of Studies and Implementation Thereof

Analysis

2.2.1.

The doctoral study programme's "Mechanical Engineering and Mechanics (51526)" content is fully relevant and topical. Learning outcomes are satisfied and extended multiple times throughout the programme. The study programme "Mechanical Engineering and Mechanics" includes science subjects that prepare experts who have developed skills and work techniques related to the respective field of science to such an extent that they can critically analyze the problems of the field.

The study programme offers three blocks of courses: compulsory study courses, specialization (Limited choice subjects), and free choice study courses. The compulsory study courses are common to all students of the programme "Mechanical Engineering and Mechanics" and enable them to achieve essential research and scientific competencies in the field. This block consists of courses: Design and Analysis of Physical and Computer Experiments, Scientific Writing, and Protection, Promotion, and Valorisation of Scientific Results. Limited choice subjects students can choose in the amount of 21 CP, according to their dissertation topic. Study course outcomes and aims are clearly specified in the document "Mapping of study courses / modules. Annex 8" which makes the choice of the courses easier.

2.2.2.

Within the free choice study courses, students can choose any doctoral study level course at Riga Technical University they might need for their research topic. The programme ensures the integration and mutual influence of different sub-fields of "Mechanical Engineering and Mechanics", which should be considered very useful and widening the understanding of general processes in the world and increasing the work efficiency. The programme has six specializations: Mechanical Engineering Technology, Applied Mechanics, Machine Dynamics and Design, Heat Power Engineering and Heat Engineering, and Medical Engineering. In addition the RTU Centre for Academic Excellence organizes in-service training events for academics, where the doctoral students are advised to take part. This kind of participation was confirmed during the interviews. The specific evaluation criteria of each study course are given in the course e-learning environment ORTUS and they are regulated by the RTU Regulations for Assessment of Study Results document. The attestation of doctoral students at the end of the study year take place according to the RTU general Doctoral Regulations and the public doctoral defence according to Cabinet of Ministers Regulations "Procedure and Criteria for Awarding the Doctoral Degree" No. 1001 and RTU Regulations on Promotion Councils and Promotion at RTU.

2.2.3.

The study programme is applied to six specialization themes: "Mechanical Engineering Technology," "Applied Mechanics," "Machine Dynamics and Design," "Heat Power Engineering and Heat Engineering," "Medical Engineering".

Study implementation and evaluation methods, stated in study course descriptions, are rather traditional. Active, quite often in very small groups or individuals, work in the classroom, timely performance of individual work, tests and exams are listed and implemented (Annex - Descriptions of the study course, Experts group's interviews with academic staff, students and graduates). Expert's opinion is that the methods themselves contribute to the achievements of aims of outcomes of study courses. The Experts' group during the visit also noticed well developed e-learning study courses in the ORTUS environment. According to Experts' group interviews with teaching staff and students, student-centred learning is also implemented. For example, students can request additional information or new topics during theoretical lessons or additional time with their supervisors to discuss and adjust the courses according to their topic to support their research. It was stressed that the supervisors of the doctoral students are always in help to choose and discuss the courses, which is a great help for the students. According to the Self Evaluation Report, outcomes of student, graduates and teachers interviews and the experience of the graduates are used to improve or deliver the courses. Expert's group's interviews with the students revealed that students are well informed about the prospects of outgoing mobility, but are reluctant to take the opportunity because of family or being afraid of losing the company' work outside the University.

2.2.4. Not applicable

2.2.5.

The result of the study programme is an independently developed doctoral thesis with significant theoretical significance and potential for practical use.

The doctoral degree is awarded to the applicant based on the decision of the Promotion Council by order of the Rector of RTU.

The Self Evaluation Report gives on page 589 the number of the programme graduates as follows: one in 2017; two in 2018; one in 2019; zero in 2020 and four in 2021. The table on page 595 in the same document introducing the topics of the defended Thesis gives other numbers for the respective years. Tabel lk 589 number of graduates ja tabel lk 595 - Topics of doctoral theses defended during the reporting period. Both the numbers are rather low and do not assure reproduction of the Faculty academic staff. PhD students and graduates mentioned during the interviews that some course materials are rather old and not updated often and they would like to see and hear in the courses more future technologies and developments and also they would like to have more practical things introduced into the courses. The graduates and PhD students were very motivated to contribute to the development of the courses and they suggested having more visiting professors and guest lectures and also an idea was introduced during the interviews to create an option for the teachers for industrial projects related to practising. It was drawn up during the discussions that funding for these topics the students are working for is limited, so doctoral students need to earn extra income to support themselves and their families, which is often the reason for the delay with completing the Thesis or even breaking up the studies.

2.2.6.

Topics of theses were found to be relevant to the field and appropriate to the international field and topics.

All doctoral programmes include taught elements that are also examined. While courses are appropriate to the academic directions there are a lack of courses that cover more general scientific, leadership and entrepreneurial skills. Delivering units to only one or two students is unviable. The

front loading of taught courses in years 1 and 2 can also limit scientific activities and inhibit research momentum for students. Doctoral students also commented on the need for courses/lectures to include new/emerging concepts, technologies and thinking in order for them to be relevant and useful to doctoral students.

There are three RTU Doctoral Promotion Councils "RTU P-04", "RTU P-16" and "RTU P-19" entitled to award the doctoral degree (Ph.D.) in respective sub-fields (Self-Evaluation Report p.593) who are responsible to acknowledge that the doctoral thesis complies with Regulations No. 1001. The degree will be awarded by the Rector of RTU and confirmed by the Latvian Science Council. Interviews with the doctoral students, graduates and academic staff confirmed that all people are aware about the procedures and respective documents and are following them.

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

The study programme's content is interconnected and complementary, corresponds to the objectives of the programme and ensures the achievement of learning outcomes. Students are supported by the programme and adequate measures are implemented to ensure that processes are followed and fairness in progression in the doctoral promotion is ensured.

Strengths:

1. Study programme plan enable to achieve essential research and scientific competencies in the field.
2. Additional focus on valorisation of scientific results.
3. Well developed e-learning study courses in the ORTUS environment.

Weaknesses:

Not identified

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

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

Assessment of compliance: Fully compliant

Awarding degree's are based on the achievements and findings of the respective field of science

2.3. Resources and Provision of the Study Programme

Analysis

2.3.1.

In 2019 staff and students relocated to the Ķīpsala Campus. As a consequence, the majority of classes and laboratories are now on a single site. Newly refurbished facilities are available at the Ķīpsala site in addition to existing facilities at Laboratory House. Alongside this, various laboratory activities have been developed and funded under the European projects framework. For example, Laboratory House has metrological equipment from the Japanese company Mitutoyo. Additionally, there is also a welding laboratory of the Transport institute, equipment and apparatus for testing materials and structural elements under static and dynamic loads. The ARMFIELD wind tunnel is also available and a number of other pieces of equipment. These are considered as significant strengths in terms of provision.

The study provisions in the terms of laboratory base and library textbooks and e-databases are on a good level. Equipment is mostly unique and suited for the scientific research and laboratories are

equipped with the software and computing resources to support the research and the doctoral students can have access to labs upon agreement with the supervisor outside class times or install the software to home computers.

Among the most outstanding and high level resources should be mentioned the most modern Metrology Laboratory in the Baltics, opened in September 2018 at the RTU Laboratory House with Mitutoyo equipment, Welding Lab with MMA, MIG / MAG, TIG, gas welding, and cutting, plasma welding, and cutting) and scientific Laboratories of Machine and Mechanism Dynamics and Materials Experimental Mechanics equipped with the software: ADAMS, ANSYS, Catia, EDAOpt (for planning, approximation, and optimization of experiments), EDEM (for bulk material dynamics calculations), KEDRO (for multi-criteria robust optimization of composite material elements, etc. The RTU Laboratory House has also very good Medical Physics and Engineering, and Nanoengineering Laboratories for the analysis of physical properties of biomaterials and nanostructure of materials and their surface: infrared, visible light spectrometers, photoelectron emission spectrometer, XPS, Scent spectroscopy and SIM spectroscopy spectrometer; atomic force microscope, transmission microscope, laminar flow chamber; optical microscopes and image recording apparatus, etc all which create a solid base for research on the doctoral level. Medical Physics and Heat Power Systems research laboratories have in addition computed tomography equipment, respective control software and air-to-water heat pump; equipment for thermal measuring for construction and insulation materials, heat exchanger research and testing equipment and stands for heat transfer in the process and for steam compression refrigeration processes. The expert team was impressed regarding the new RTU Laboratory House facilities and laboratories supporting the doctoral programme. It is worth mentioning the availability for the doctoral students of the modern computing infrastructure of RTU HPC (High-Performance Computing) Center or Scientific Computing Center equipped with scientific software needed for research (<http://hpc.rtu.lv/>). Though not mentioned in the Self Evaluation Report the RTU Design Factory provides resources for prototyping the research results if needed.

2.3.2.

Beyond the taught courses, training and support of doctoral students appears limited. The central/faculty team provides monthly newsletters and signposting for conferences. Limited dedicated training sessions/support for doctoral researchers are provided. This is a particular problem for those who undertake high levels of teaching and lack prior experience or training. But, the good and broad framework of RTU cooperation with other scientific institutions and higher education institutions in the doctoral study programme implementation and research activities provide very positive field for students for achieving learning and research outcomes.

2.3.3.

RTU funding from the state basic budget consists of study base funding corresponding to the list of study programs and the number of students, scientific activities.

Students attended many regional and some international conferences and had access to funding.

Renewal of the study infrastructure depends on the state budget financing and research projects finances. The state budget allocated to the programme depends on the number of the students and study cost coefficients and recalculated each year. The value of study cost coefficient doctoral study programme is three times higher than the values of study cost coefficients specified for the bachelor level programmes (Self Evaluation Report, section 3.3.3). Based on this information, the head of the structure can plan the work of the structural unit and renewal of the equipment. Experts noticed that most of the equipment available in the RTU Laboratory House is gift or sponsored or bought from research grants and not from the state budget. This is a clear indication of a good collaboration between the RTU and companies and shows trust of the collaborators and solid background of the research. On the other hand, the situation indicates certain instability on the part of the University's

upper management (responsible for acquiring and maintaining SOA equipment), in renewing the equipment for the specific study program and study course. In parallel the question raised from the experts whether the international students are all self paying is the cost of their study place covered fully by their payment or only partially covered and partially financed from the state budget. The Self Evaluation Report and Annexes did not adequately address this question and provide a convincing response.

To support everyday learning and communication the students have MS Teams accounts, provided by RTU and the panel feels that the provision of computing is sufficient in the labs and computer clusters. Therefore, all the students confirmed during the interviews not having problems during the COVID lock down in communicating with the teachers and supervisors and accessing the computer resources from home.

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

RTU and the Faculty of Mechanical Engineering, Transport and Aeronautics have great and nationally significant capacities for developing the of the study programme. The good and broad framework of RTU cooperation with other scientific institutions and higher education institutions in the doctoral study programme implementation and research activities provide very positive field for students for achieving learning and research outcomes.

Strengths:

1. Availability of a wide range of laboratories.
2. Informative provision is supported for young researchers.
3. RTU motivates and supporting doctoral students by elaborating the final thesis, research activities, publications and participating in conferences and seminars.

Weaknesses:

Not identified

Assessment of the requirement [6]

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

Assessment of compliance: Fully compliant

The study programme`s resources, material, technical and financial provision are fully compliant with the conditions for the implementation of the study programme and ensuring the achievement of the learning outcomes. Infrastructure is sufficient, but the staff salaries are low and doctoral students should have opinion to concentrate on the research and not earning income outside the University. This fact does not impact the general compliance of study and science provision.

2.4. Teaching Staff

Analysis

2.4.1.

Ten professors - doctors of sciences, "Mechanical Engineering and Mechanics" or "Physics and Astronomy" participate in implementing the study programme.

Ten professors(doctors of sciences) and four elected associate professors participate in the

development of the study program. The study program "Mechanical Engineering and Mechanics" was developed with new content and planning accordingly, the existing teaching staff is considered to be newly created and no changes have been made since the moment of licensing the programme. According to the Latvian Council of Science not less than five persons with a doctoral degree must participate in the implementation of the academic doctoral study program, at least three of whom are experts in the relevant field. For the current programme 18 doctors of sciences participate in the implementation of the study courses of the study program and the scientific and pedagogical qualification of doctors of science complies with the criteria specified in regulatory enactments regarding the evaluation of the scientific and pedagogical qualification of a candidate for the position of professor and associate professor (Appendix to the Self Evaluation Report - Confirmation on compliance of the academic staff).

A broad range of staff are involved in supervision of doctoral students and have varying levels of experience. However, there was no evidence of, for example, combining a junior (inexperienced) academic with a senior (more experienced) supervisor was established or evidenced. The necessary training for 'good doctoral supervision' also appears to be somewhat lacking meaning that support for supervisors and hence doctoral students is inconsistent.

2.4.2.

No changes have been made since the moment of this assessment.

2.4.3.

All teaching staff are considered as 'experts' of Latvian Council of Science.

The scientific and pedagogical qualifications of the teaching staff responsible for the study courses of the study programme comply with the Cabinet of Ministers 25.02.2021. Regulation No. 129 "Procedure for the Evaluation of the Results of the Scientific and Pedagogical Qualification or Artistic Creativity of a Candidate for the Position of Professor or Associate Professor and Professor or Associate Professor in Position". The compliance of the academic staff to the state documents is confirmed by the document signed by the Vice-Rector of RTU "On compliance of the academic staff involved in implementation of the academic study programmes corresponding to the study field "Mechanics and Metal Processing, Heat Power Engineering, Heat Technology, and Mechanical Engineering" with the provisions set out in Section 55, Paragraph one, Clause three of the Law on Higher Education Institutions".

There is an annual progress report/review in place that considers courses and publications and plans for the following year. A request was made to the Faculty to provide evidence of the operation of this process including data on progression/suppression year-on-year.

2.4.4.

Every teaching staff has published at least 5 relevant publications.

The list of projects of teaching staff, funding sources, and respective funding amounts is given in the Annex 3.4.4. Teaching staff project_Mācībspēku projekti EN_LV to the Self Evaluation Report and is solid and the sums of the funding are high. It is unclear what is the proportion of the state financing and research (project) financing of the staff and laboratories involved in delivering the programme and what is the total sum of the direct research project financing (the amount of the project budget allocated to the specific RTU laboratory) by years of respective laboratories. Experts noticed during the interviews the low salary problem for teachers and especially for creating options for the doctoral students to work on the research projects at the University.

2.4.5.

Joint study courses and participation in collaborative projects and joint publications testify to the close cooperation of teaching staff.

The staff of the programme collaborates in research projects and they have numerous joint publications, which testify the cooperation too (list of the , which can be seen in the lecturers' and in the list of publications (list of the teaching staff CV-s).

The mobility of the teaching staff decreased considerably during the COVID years, from 2018-2021 although being higher before the COVID started and it was confirmed by the teaching staff during the interviews that mobility for both the teachers and doctoral students will increase in line with reduction of COVID restrictions. The students stressed during the interviews that they are waiting for more visiting lecturers to introduce novel directions in science related to their research and study field.

The RTU and Faculty values its academic staff and ensures regular professional development, methodological and consultative support of the academic staff, which was confirmed in interviews. This helps to avoid negative effects of the changes in the composition of the teaching staff where most of the teaching staff are those who participated in delivering the earlier doctoral programme courses too. On the other hand both the teachers and students mentioned the aging problem of the teaching staff.

The teaching staff of the study program and doctoral students supervisors are cooperating in the implementation and updating of the content of the study courses, and coordinating the topics in the course programs in order to avoid unnecessary duplication and to adjust the course contents. This is regulated by the "Procedure for Application, Development Amendment of the Study Programs" and coordinated by the head of the study programme. This information was confirmed during the interviews with the administration of the College and the study field, as well as with teachers.

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

In summary, the expertise of the staff is appropriate to the field and focus of the research themes. Staffing levels are appropriate and steadily increasing, which is highly advantageous. Publications for the staff are clear and relevant. However, junior staff members lacked the necessary training in effective doctoral supervision, and the programme did not identify how this would be overcome.

Strengths:

1. Appropriate levels of staffing is observed.
2. Good publication levels of esteem for the teaching staff.

Weaknesses:

1. The doctoral supervision expertise for more junior staff members is noted, and the means to remedy this is not adequately addressed or explained.

Assessment of the requirement [7]

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

Assessment of compliance: Fully compliant

The qualifications of the academic staff members and the involvement of the academic staff in scientific research and projects are on a good level.

2.5. Assessment of the Compliance

Requirements

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Fully compliant

The programme and the courses are available in Latvian and English, comply with the requirements set forth in the Law on Higher Education Institutions

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

Assessment of compliance: Fully compliant

The diploma sample provided in SAR Annex fully complies with the procedure and regulations by which Latvian state-recognised documents of higher education are issued

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Fully compliant

Compliance provided in SAR Annex

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

Assessment of compliance: Not relevant

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

Assessment of compliance: Not relevant

Assessment of the requirement [8]

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

Assessment of compliance: Fully compliant

The study programme fully complies with the legal requirements outlined in the Law on Institutions of Higher Education and other regulatory enactments.

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

In conclusion, the study programme overall is considered to be satisfactory. The current levels of

resourcing is considered as a positive in terms of staffing levels, facilities and equipment. The procurement method to obtain SoA equipment is considered as helpful to the programme, however, the ongoing maintenance and replacement of such high value items should be better planned and overseen by the University management, and not left to external organisations to provide solutions. Junior supervision staff training is noted as an ongoing issue that will have significant implications for the future. The lack of planned training will affect the level of effective supervision that will be provided by the staff to the research students.

Strengths:

1. Well developed and planned content of study programme.
2. Additional focus on valorisation of scientific results.
3. The facilities, laboratories and equipment is likewise a significant strength.
4. The staffing resources are considered excellent.

Weaknesses:

1. Lack of professional training for junior staff members to provide adequate levels of supervisor support to research students.

Evaluation of the study programme "Mechanical Engineering and Mechanics"

Evaluation of the study programme:

Excellent

2.6. Recommendations for the Study Programme "Mechanical Engineering and Mechanics"

Short-term recommendations

Introduce clear plans on how to increase the percentage of the graduates

Introduce professional training courses for junior staff members to provide adequate levels of supervisor support to research students

Long-term recommendations

Introduce longer term appropriate financing planning (re. equipment)

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

Requirements	Requirement Evaluation			Comment
R1 - Pursuant to Section 5, Paragraph 2.1 of the Law on Higher Education Institutions, the higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing its internal quality assurance system:	Fully compliant			The University introduced the Quality Management Policy and respective quality assurance system and the detailed regulations for the Study Field, which is an essential step for the study programmes continuous improvement.
R2 - Compliance of scientific research and artistic creation with the level of development of scientific research and artistic creation (if applicable)	Fully compliant			Good publication rates, well-developed scientific and applied research strategy and ongoing programme of investment.
R3 - The cooperation implemented within the study field with various Latvian and foreign organizations ensures the achievement of the aims of the study field.	Fully compliant			The good and broad framework of RTU cooperation with other Latvian and foreign organizations, scientific institutions and higher education institutions in the study field implementation and research activities provide very positive field for students for achieving learning and research outcomes.
R4 - Elimination of deficiencies and shortcomings identified in the previous assessment of the study field, if any, or implementation of the recommendations provided.	Fully compliant			The previous shortcomings of the field study and implementations of the previous assessment report recommendations that were provided have been well addressed. No significant shortcomings are identified.

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)

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)
1	Mechanical and Instrumental Engineering (42521)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
2	Mechatronics (42521)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
3	Heat Power and Thermal Engineering (42522)	Not relevant	Partially compliant	Fully compliant	Fully compliant	Good
4	Automotive Transport Engineering (42525)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
5	Aviation Transport (42525)	Not relevant	Partially compliant	Partially compliant	Fully compliant	Good
6	Railway engineering (42526)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
7	Medical Engineering and Medical Physics (42526)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent
8	Industrial Design (42548)	Not relevant	Partially compliant	Fully compliant	Fully compliant	Good
9	Engineering Technology, Mechanics and Mechanical Engineering (43521)	Not relevant	Fully compliant	Fully compliant	Fully compliant	Excellent

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)
10	Aeronautics and Transport Systems Engineering (43525)	Not relevant	Partially compliant	Partially compliant	Fully compliant	Good
11	Engineering Technology, Mechanics and Mechanical Engineering (45521)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent
12	Production Engineering (45521)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent
13	Aerospace systems engineering (45525)	Fully compliant	Partially compliant	Partially compliant	Fully compliant	Good
14	Aviation Transport (45525)	Fully compliant	Partially compliant	Partially compliant	Fully compliant	Good
15	Heat Power and Thermal Engineering (47522)	Fully compliant	Partially compliant	Fully compliant	Fully compliant	Good
16	Automotive Transport Engineering (47525)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent
17	Railway engineering (47526)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent

No.	Study programme	R5	R6	R7	R8	Evaluation of the study programme (excellent, good, average, poor)
18	Medical Engineering and Medical Physics (47526)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent
19	Transport (51525)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent
20	Mechanical Engineering and Mechanics (51526)	Fully compliant	Fully compliant	Fully compliant	Fully compliant	Excellent

The Dissenting Opinions of the Experts

None.