STUDIJŲ KOKYBĖS VERTINIMO CENTRAS
CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

PRODUCTION and MANUFACTURING ENGINEERING FIELD OF STUDY

Vilnius Gediminas Technical University

EXTERNAL EVALUATION REPORT

Expert panel:

1. Panel chair: Prof. dr. Gita Revalde ..... (signature)
2. Academic member: Prof. Dr. Brian Vejrum Wæhrens;
3. Academic member: Prof. Dr. Tauno Otto;
4. Social partner representative: Dr. Vaidas Liesionis;
5. Student representative: Mr Džiugas Vyšniauskas.

SKVC coordinator: Dr. Ona Šakaliene

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I. INTRODUCTION

1.1. OUTLINE OF THE EVALUATION PROCESS

The field of study evaluations in Lithuanian higher education institutions (HEIs) are based on the following:

- Procedure for the External Evaluation and Accreditation of Studies, Evaluation Areas and Indicators, approved by the Minister of Education, Science, and Sport;
- Methodology of External Evaluation of Study Fields approved by the Director of the Centre for Quality Assessment in Higher Education (SKVC);
- Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

The evaluation is intended to support HEIs in continuous enhancement of their study process and to inform the public about the quality of programmes within the field of study.

The object of the evaluation is all programmes within a specific field of study. A separate assessment is given for each study cycle.

The evaluation process consists of the following main steps: 1) Self-evaluation and production of a self-evaluation report (SER) prepared by an HEI; 2) A site visit by the review panel to the HEI; 3) The external evaluation report (EER) production by the review panel; 4) EER review by the HEI; 5) EER review by the Study Evaluation Committee; 6) Accreditation decision taken by SKVC; 7) Appeal procedure (if initiated by the HEI); 8) Follow-up activities, which include the production of a Progress Report on Recommendations Implementation by the HEI.

The main outcome of the evaluation process is the EER prepared by the review panel. The HEI is forwarded the draft EER for feedback on any factual mistakes. The draft report is then subject to approval by the external Study Evaluation Committee, operating under SKVC. Once approved, the EER serves as the basis for an accreditation decision. If an HEI disagrees with the outcome of the evaluation, it can file an appeal. On the basis of the approved EER, SKVC takes one of the following accreditation decisions:

- **Accreditation granted for 7 years** if all evaluation areas are evaluated as exceptional (5 points), very good (4 points), or good (3 points).
- **Accreditation granted for 3 years** if at least one evaluation area is evaluated as satisfactory (2 points).
- **Not accredited** if at least one evaluation area is evaluated as unsatisfactory (1 point).

If the field of study and cycle were **previously accredited for 3 years**, the re-evaluation of the field of study and cycle is initiated no earlier than after 2 years. After the re-evaluation of the field of study and cycle, SKVC takes one of the following decisions regarding the accreditation of the field of study and cycle:

- To be accredited for the remaining term until the next evaluation of the field of study and cycle, but no longer than 4 years, if all evaluation areas are evaluated as exceptional (5 points), very good (4 points) or good (3 points).
- To not be accredited, if at least one evaluation area is evaluated as satisfactory (2 points) or unsatisfactory (1 point).

1.2. REVIEW PANEL

The review panel was appointed in accordance with the Reviewer Selection Procedure as approved by the Director of SKVC.

The composition of the review panel was as follows:

1. Panel chair: Prof. Dr. Gita Revalde, professor at the Riga Technical University Institute of Technical Physics, Latvia;
2. Academic member: Prof. Dr. Brian Vejrum Wæhrens, professor at the Aalborg University Department of Materials and Production, Denmark;
3. Academic member: Prof. Dr. Tauno Otto, professor at Tallinn University of Technology School of Engineering Department of Mechanical and Industrial Engineering, Estonia;
4. Social partner representative:
5. Student representative: Mr Džiugas Vyšniauskas Second-year master's student of the life and chemical physics programme of Vilnius University's Faculty of Physics, Lithuania.

1.3. SITE VISIT

The site visit was organised on November 20-21, 2024, onsite.

Meetings with the following members of the staff and stakeholders took place during the site visit:

- Senior management and administrative staff of the faculties;
- Team responsible for preparation of the SER;
- Teaching staff;
- Students;
- Alumni and social stakeholders including employers.

There was no need for translation and the meetings were conducted in English

1.4. BACKGROUND OF THE REVIEW

Overview of the HEI

Vilnius Gediminas Technical University (further **-** VILNIUS TECH or VGTU) is a technical university that provides many study programmes in engineering. The University operates in 27 study fields, including the following groups of study fields: Engineering, informatics, mathematics, technologies, social sciences, business and public administration, and the humanities and arts.

Overview of the study field

Production and manufacturing engineering study field programmes are offered at VILNIUS TECH Faculty of Mechanics and Faculty of Architecture. Four first-cycle study programmes are implemented in this study field:

- Industrial Product Design (IPD) without specializations (launched in 2013)
- Production Engineering and Management (PEM) ((launched in 2013)
- Mechatronics and Robotics (MR) (launched in 2014)
- Applied Artificial Intelligence (AAI) (launched in 2021).

6 second cycle study programmes are offered in the Production and manufacturing engineering study field:

- Industrial Design (launched in 2017);
- Mechatronics joint degree programme (launched in 2014);
- Mechatronics Systems (launched in 2014);
- Materials and Welding Engineering (launched in 2011);
- Industrial Engineering (launched in 2011);
- Industrial Engineering and Innovation Management (launched in 2014).

The Mechatronics Joint degree programme is implemented together with the Technical University of Braunschweig (Germany), while Industrial Engineering and Innovation Management offers a double degree option with the University of Palermo (Italy) and Tallinn University of Technology (Estonia).

Previous external evaluations

Previous accreditation reports are available for Production Engineering and Management, Printing Engineering, Industrial Engineering, Construction Materials, Industrial Engineering, and Innovation Management. All programmes were positively evaluated with an average grade of 3. Only two of these programmes are included in the current evaluation.

Documents and information used in the review

The following documents and/or information have been requested/provided by the HEI before or during the site visit:

- Self-evaluation report and its annexes;
- Final theses;
- Protocols of the Study programme committee (in Lithuanian);
- Information about the sites for surveys of graduates (https://docs.google.com/forms/d/1JjvRQgfC4WIATgkyoIyr4aIFrjVjN_IHY1QVMikSdU4/viewanalytics);
- Surveys of Social partners (https://docs.google.com/forms/d/1-

SBnYWuANw2yqV200_CIcvFmiuFcKAOVxA1IE_rN5FY/viewanalytics);
- Tables and some annexes of the SER (curriculum of Industrial Design and Industrial Product Design) translated into English;
- Information about chairpersons of study programmes.

Additional sources of information used by the review panel:

The following additional sources of information have been used by the review panel:

- https://vilniustech.lt/"https://vilniustech.lt/;
- Times Higher Education – world university rankings;
- QS world university rankings.

II. STUDY PROGRAMMES IN THE FIELD

First cycle/LTQF 6

Title of the study programme	**Industrial Product Design**	**Production Engineering and Management**
State code	6121EX049	6121EX047
Type of study (college/university)	University	University
Mode of study (full time/part time) and nominal duration (in years)	Full time (4)	Full time (4)
Workload in ECTS	240	240
Award (degree and/or professional qualification)	Bachelor of Engineering Science	Bachelor of Engineering Science
Language of instruction	Lithuanian	Lithuanian
Admission requirements	Secondary education	Secondary education
First registration date	0**1**-07-201**3**	01-07-2013
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		

First cycle/LTQF 6

Title of the study programme	**Mechatronics and Robotics**	**Applied Artificial Intelligence**
State code	6121EX048	6121EX084
Type of study (college/university)	University	University
Mode of study (full time/part time) and nominal duration (in years)	Full time (4)	Full time (4)
Workload in ECTS	240	240
Award (degree and/or professional qualification)	Bachelor of Engineering Science	Bachelor of Engineering Science
Language of instruction	Lithuanian/English	Lithuanian/English
Admission requirements	Secondary education	Secondary education
First registration date	0**1**-07-201**3**	01-07-2018
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		

Second cycle/LTQF 7

Title of the study programme	**Industrial Design**	**Mechatronics***
State code	6213EX002	6281EX003
Type of study (college/university)	University	University (joint degree) studies VILNIUS TECH[1] and TUB[2]
Mode of study (full time/part time) and nominal duration (in years)	Second cycle /Full time (2)	Second cycle /Full time (2)
Workload in ECTS	120	120
Award (degree and/or professional qualification)	Master of Engineering science	Master of Mechatronic Engineering science
Language of instruction	English	English
Admission requirements	Bachelor or university equivalent degree	Bachelor or university equivalent degree
First registration date	0**1**-07-2017	19-06-2014
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		**Vilnius Gediminas Technical University Vilnius Gediminas Technical University (VILNIUS TECH), Lithuania;2 Technical University of Braunschweig (TUB), Germany;*

Second cycle/LTQF 7

Title of the study programme	**Mechatronic Systems**	**Materials and Welding Engineering**

State code	6211EX053	6211EX054
Type of study (college/university)	University	University
Mode of study (full time/part time) and nominal duration (in years)	Second cycle /Full time (2)	Second cycle /Full time (2)
Workload in ECTS	120	120
Award (degree and/or professional qualification)	Master of Engineering science	Master of Engineering science
Language of instruction	Lithuanian/English	Lithuanian
Admission requirements	Bachelor or university equivalent degree	Bachelor or university equivalent degree
First registration date	26-05-2014	16-04-2011
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		

Second cycle/LTQF 7

Title of the study programme	**Industrial Engineering**	**Industrial Engineering and Innovation Management**
State code	6211EX055	6211EX056
Type of study (college/university)	University	University (double degree) studies VILNIUS TECH[1] and UNIPA[3] or TalTech[4]
Mode of study (full time/part time) and nominal duration (in years)	Second cycle /Full time (2)	Second cycle /Full time (2)
Workload in ECTS	120	120
Award (degree and/or professional qualification)	Master of Engineering science	Master of Engineering science
Language of instruction	Lithuanian/English	Lithuanian
Admission requirements	Bachelor or university equivalent degree	Bachelor or university equivalent degree
First registration date	16-04-2011	01-01-2014
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		**Vilnius Gediminas Technical University Vilnius Gediminas Technical University (VILNIUS TECH), Lithuania; 3 University of Palermo (UNIPA), Italy;4 Tallinn University of Technology (TalTech), Estonia.*

III. ASSESSMENT IN POINTS BY CYCLE AND EVALUATION AREAS

The **first cycle** of the production and manufacturing engineering field of study is given a **positive** evaluation.

No.	Evaluation Area	Evaluation points[1*]
1.	Study aims, learning outcomes and curriculum	4
2.	Links between scientific (or artistic) research and higher education	4
3.	Student admission and support	4
4.	Teaching and learning, student assessment, and graduate employment	5
5.	Teaching staff	4
6.	Learning facilities and resources	5
7.	Quality assurance and public information	4
	Total:	30

The **second cycle** of the production and manufacturing engineering field of study is given a **positive** evaluation.

No.	Evaluation Area	Evaluation points[2*]
1.	Study aims, learning outcomes and curriculum	4
2.	Links between scientific (or artistic) research and higher education	3
3.	Student admission and support	4
4.	Teaching and learning, student assessment, and graduate employment	4
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Quality assurance and public information	3
	Total:	26

1*

1 (unsatisfactory) - the area does not meet the minimum requirements, there are substantial shortcomings that hinder the implementation of the programmes in the field.
2 (satisfactory) - the area meets the minimum requirements, but there are substantial shortcomings that need to be eliminated.
3 (good) - the area is being developed systematically, without any substantial shortcomings.
4 (very good) - the area is evaluated very well in the national context and internationally, without any shortcomings.
5 (exceptional) - the area is evaluated exceptionally well in the national context and internationally.

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IV. STUDY FIELD ANALYSIS

AREA 1: STUDY AIMS, LEARNING OUTCOMES AND CURRICULUM

1.1.	Programmes are aligned with the country's economic and societal needs and the strategy of the HEI

1.1.1. Programme aims and learning outcomes are aligned with the needs of the society and/or the labor market

The study field aims to facilitate the training of Production and Manufacturing study field bachelor's and master's study programmes comply with the requirements to meet economic needs. Those needs are well reflected to the labour market situation of the country. Production and manufacturing field companies in Lithuania generate 1/5 of GDP and historically are very concentrated in various metal processing areas. The aims and learning outcomes are defined in terms of both the academic content and scientific and professional requirements for Bachelors' and Master level studies in Production and manufacturing. From SER listed employers of Vilnius region, we can see a wide range of industries, from metal processing to health care consumables production, precise mechanics, optomechanical devices production, transportation sector, and laser equipment design and manufacturing. Other industries like furniture, automotive, pharma, aviation, food, electronics and space engineering are also demanding such graduates. It looks like each study programme has some overlap but is not critical and well-focused with others and its good as a large skilled engineer's variety can be prepared for almost all present and potential future Lithuanian industries. All study programmes look modern and up-to-date, and no obsolete subjects have been observed.

SER mentioned enterprises almost permanently have an unfulfilled need for professionals from the Production and Manufacturing study field programmes. Just one company mentioned in SER is under bankruptcy so it's to be removed from the SER as a reference.

1.1.2. Programme aims and learning outcomes are aligned with the HEI's mission, goals, and strategy

The aims and outcomes of the study programmes are to train Production and Manufacturing engineers with a high professional level, who are creative and have a community-minded capability to anchor themselves in the science and labor markets of Lithuania and internationally. This conforms with the general goal of HEI to produce future specialists and creative personalities, with advanced research skills, able to develop scientific activities of international standard that promote scientific progress and cultural education of the society.

ANALYSIS AND CONCLUSION (regarding 1.1.)

The aims and learning outcomes for Bachelor's and Master's studies in Production and Manufacturing align with academic, scientific, and professional standards. Employers in the Vilnius region represent diverse industries, including metal processing, healthcare consumables, precision mechanics, optomechanical devices, transportation, laser equipment, furniture, automotive, pharma, aviation, food, electronics, and space engineering, highlighting the demand for such graduates. Each programme offers distinct specialization opportunities and is well structured to ensure a broad range of skilled engineers for current and future Lithuanian industries. The study programmes are modern, with no outdated subjects, and employers consistently express a need for graduates in this field. During the meeting with industry representatives, everyone expressed satisfaction with the university graduates, but everyone unanimously stated that more graduates in this field need to be prepared.

1.2.	Programmes comply with legal requirements, while curriculum design, curriculum, teaching/learning, and assessment methods enable students to achieve study aims and learning outcomes

1.2.1. Programmes comply with legal requirements

The discussed study programmes belong to the Production and Manufacturing study field (E10) - 4 bachelor's, 1 bridging study programme and 6 master's study programmes comply with the requirements of Lithuanian regulations. The main university documentary according to what study programmes are developed is VILNIUS TECH Senate Resolution No. 107-2.2 as of 11 December 2018 defining the Requirements for the Development and Provision of Study Programmes. In addition, the EUR-ACE Standards and Guidelines for Accreditation of Engineering Programmes, Dublin descriptors, EQF and ECTS user guide are applied.

1.2.2. Programme aims, learning outcomes, teaching/learning and assessment methods are aligned

Learning outcomes of study programmes are described in accordance with “Descriptor of the Study Field of Engineering” approved by Order of the Minister of Education, Science and Sport of the Republic of Lithuania No. V-9648, as of 5 July 2023. The course cards, containing the study programmes aims, learning outcomes, and assessment methods are elaborated. The aim and skills matrixes for every programme in the field of Production and manufacturing were prepared and presented in the Annexes. Each course card provides details on the knowledge evaluation process and student performance assessment based on a three-level criteria system. Master's degree programs, unlike Bachelor's programs, emphasize developing analytical skills, managing non-standard situations, conducting scientific research, and drawing conclusions. Consequently, in Master programmes, nearly all courses (modules) incorporate a greater emphasis on independent work, individual research and consultations, project assignments, and presentations. Some lectures can be conducted remotely, some in hybrid mode.

1.2.3. Curriculum ensures consistent development of student competences

Assessment of the Production Engineering and Manufacturing Engineering Programme

General Course List Assessment

The general overview of courses in the Production and Manufacturing Engineering programme covers fundamental engineering principles, which are essential for building a broad base of knowledge for students. All programmes comply with formal requirements in terms of workload, credits and organisation of learning opportunities. Courses in Mathematics, Physics, Materials Science, Mechanics, and Engineering provide a solid grounding and progression in the foundational technical skills required in any engineering field, including production systems. In the first cycle, this applies to:

- **Language, Communication, Human Safety and Environmental Protection -** most of which are electives/alternative options, but central to navigating in the study and in the world.
- **Mathematics** (three levels) and **Physics** (two levels) are essential for modelling and understanding engineering problems.
- **Mechanics**, **Materials Science**, and **Engineering Mechanics** are fundamental to understanding how physical systems behave, which is especially relevant to designing production systems and machinery.
- **Technical Drawing** and **Engineering Graphics** offer practical skills in communicating design and mechanical structures.

However, many of these courses seem heavily focused on mechanical engineering basics (e.g., fluid mechanics, thermodynamics, machine elements), which may skew the profile towards maintenance, machine building, and more traditional manufacturing environments. This focus, while still relevant, might be insufficiently future-oriented if the programme aims to align more directly with emerging industry trends like **production system automation**, **robotics**, **industrial metaverse**, **digital manufacturing**, and **supply chain optimization**.

Fundamental skill courses for the second cycle are:

- **Fundamentals of research and AI**.
- **Process improvement**
- Context topics such as: **Marketing, HR, Strategy, Management;**
- Manufacturing systems**: ERP, simulation.**

It would also be important to note that especially for the second cycle even more future-oriented, best similar international programmes seem to emphasize more the need for interdisciplinary competencies enabling manufacturing engineers to understand the “why” of certain design choices related to e.g. user perspectives, performance considerations, and sustainability challenges. This is emphasized as an integral part of the **progression** in the studies, due to specific industry needs to broaden the impact of manufacturing engineering beyond technical execution and allows them to understand and design the manufacturing system by relating elements of the complex system to the purpose and contextual contingencies of the manufacturing system.

Assessment of the Second Cycle programmes:

Specialization cluster 1: Industrial Engineering and Industrial Engineering and Innovation Management (collaborative programme with TALTECH and UNIPA)

While the IE programme is leaning more towards a technology focus than the IEIM program, the specializations focus more on **business and management skills**, with course topics in the domain of: Production Planning and Organization, Accounting and Audit, Strategic Management, and Marketing. These are, however, essential for students pursuing leadership or managerial roles in industrial settings. The collaborative programme with international partners offers a great opportunity for students to advance their knowledge and personal skills.

- The courses in **New Manufacturing Processes, Production Technologies**, **Engineering Changes Management**, and **Strategic Management** seem well-aligned with the needs of industries looking for leaders who can manage both the technical and business aspects of production environments.
- While the management-oriented courses are well-rounded, there’s a risk that this specialization could focus too heavily on business strategies and not enough on the technical, systems engineering side that increasingly defines modern production systems. There's limited focus on **digital technologies**, **industrial metaverse**, **automation**, or **sustainability**—all essential for future industry needs. Although courses match the profile It is difficult to discern how the course portfolio ensures a strong progression towards the IE and IEIM profiles.

Specialization cluster 2: Mechatronics (collaborative programme with Technical University of Braunschweig) and Mechatronic Systems

The specializations show more direct relevance to the **design and integration of production systems**, though it still maintains a certain mechanical engineering focus.

- **Design of Technological Equipment**, **Design of Enterprises and Integrated Manufacturing**, and **Computer-Aided Control of Technological Processes** reflect a broader systems approach to manufacturing, involving both technology and business integration. These courses move the programme in a more **systems engineering** direction, making them relevant for modern production environments.
- The **CAD/CAM Systems** course further emphasizes **digital design tools**, which is important for addressing the automation, precision, and flexibility demands of modern manufacturing.

However, there remains a heavy reliance on traditional **mechanical engineering skills** (e.g., cutting theory, tools design, mechanical processes), which could be better balanced with systems engineering topics like optimization, supply chain management, and advanced automation. The opportunity to be part of an international educational collaboration is a great opportunity for the students to test and develop their knowledge to international standards.

Specialisation cluster 3: Industrial design

The specialization is co-organized with the faculty of Architecture with the purpose of providing students with cross-disciplinary knowledge of the study fields of Manufacturing Engineering and Arts. Course work and learning facilities are split between two locations in the city. The programme offers opportunities for understanding of design at various stages of the industrial system (design, organize and manage) while combining functionality and aesthetics, and fulfils the ambitions expressed in the study plan.

During the visit several stakeholders expressed how the cross-faculty coordination can sometimes lead to challenges related to communication, coordination, planning and availability of staff for Q&A.

Specialization cluster 4: Materials and Welding Engineering (MWE)

The combination of **material science and materials processing technology** is important and timely, especially with the event of secondary resource streams from repurposed or recycled materials. The curriculum is focused on building a progression of **materials science and welding processing**, which seems to provide a good foundation for the students, which is also supported by good lab facilities. It could be recommended that a stronger focus on advances in processing technologies and integration with product design and lifecycle systems (eg. PLM) be implemented in the curriculum, to ensure that students are even better equipped for the development of future industrial systems.

Sub-conclusion

The programmes offer a solid technical foundation but could benefit from more focus on future-oriented trends such as **automation**, **systems integration**, and **digital design & manufacturing** and the interaction of the two. Specializations provide useful skills for the industry but may fall short in addressing the more advanced technological shifts that are increasingly defining the manufacturing and production landscape. Enhancing the programme with **systems engineering**, **digital technologies**, and **business-technology integration** would better prepare students to meet the demands of future industry needs. **Industrial engagement** could also play a stronger role in relating skills and competencies to needed industrial capabilities, and hereby advancing the transition from student to reflective practitioner.

Assessment of the First Cycle Programs:

Cluster 1: Mechatronics and Robotics Programme (MRP); Applied Artificial Intelligence (AAI); Production Engineering and Management (PEM); and Industrial Product Design (IPD)

Alignment with Programme Aims:

- The overall first-cycle curriculum provides a solid foundation in both core mechatronics and robotics competencies and Production & Product Engineering (e.g., control systems, systems building, software, automation, and materials science), aligning well with the programs' aims to prepare graduates for designing and developing production, product, robotic and mechatronic systems across various industries.
- The inclusion of essential engineering subjects (mechanics, physics, materials, mathematics, and electronics) ensures that students develop the necessary theoretical understanding to tackle complex technical challenges in the study fields.
- Special courses like CAD/CAM, Theory of Algorithms, Construction, Image recognition, Machine learning, Machine elements, and Materials science cater to the hands-on design aspects of the different specializations, which are crucial for the practical application of robotic/production/product systems in focus for different programs.

Industry Relevance:

- The programmes address key industry demands, particularly in sectors, such as automation, manufacturing, and robotics.
- While the focus on traditional mechanical engineering skills (e.g., mechanics, thermodynamics, and materials science) provides strong preparation for industries that focus on automation, the curriculum could benefit from greater emphasis on emerging fields like healthcare robotics and biomechanics, which are becoming increasingly important in the robotics sector.
- The inclusion of specialised courses like “AI application”, "Robot Systems" and "Mechatronics Design" positions the well for graduates aiming to work in cutting-edge fields such as autonomous systems and robotics for manufacturing.

Future Orientation:

- The curriculum reflects a good balance of traditional engineering knowledge and practical robotics skills, but it could benefit from a stronger emphasis on future trends in the industry, particularly the integration of AI and machine learning into robotics, and the use of advanced sensors, and planning & control systems.
- Emerging areas like biomechanics and healthcare robotics are not currently represented, but there is significant potential to integrate them into the curriculum to prepare students for the growing field of medical robotics and assistive technologies. This could involve offering specialised courses in healthcare robotics, biomimetic design, or biomechanics, which would expand career opportunities for graduates in the healthcare sector.
- Considering the increasing role of robots in healthcare, adding content related to assistive devices, rehabilitation robots, and robotic surgery could enhance the program's future-oriented appeal.

Profile for Industry Needs:

- The programmes offer a well-rounded profile for industries focused on manufacturing, machine building, and automation, equipping students with skills in machine design, robotics, and control systems.
- However, to enhance the program's attractiveness to industries beyond traditional manufacturing, incorporating courses related to human-robot interaction, healthcare applications, and medical robotics could help bridge the gap between industrial mechatronics and healthcare engineering.

Sub-conclusions and sub-recommendations:

The First Cycle programmes offer a robust curriculum tailored to traditional industries in automation and manufacturing. However, to stay competitive and future-proof, the programmes could consider:

- Integrating emerging topics such as AI-driven robotics, mass customization, design for x, machine learning in automation, industrial metaverse and healthcare robotics.
- Strengthening connections with interdisciplinary fields such as biomedical engineering to ensure graduates are well-equipped for the expanding healthcare/service sector.

By updating the curriculum to reflect these emerging trends, the programme will not only continue to meet current industry demands but also provide graduates with the skills to innovate in the rapidly evolving fields of e.g., service operations, healthcare robotics and biomechanics.

1.2.4. Opportunities for students to personalise curriculum according to their personal learning goals and intended learning outcomes are ensured

Bachelor's degree programs in the Production and Manufacturing study field offer two elective courses (3 ECTS each), available in either the fifth and seventh semesters or the fourth and sixth semesters. Students enrolled in the Production Engineering and Management programme can select between two specialisations after the fourth semester: "Industrial Technology" and "Industrial Enterprise Management." There is also a bridging programme “Mechatronics and robotics” for college graduates that is realized on Saturdays. Also, second-level study programmes offer one or two electives (6 ECTS) in the 3rd semester (5 students minimum requirement).
Theoretical lectures of the 2nd cycle programmes are conducted online (after pandemics).
Also individual study plans are possible not exceeding 45 credits per academic year.
Moodle environment is used for placing study materials. Students are allowed to choose the thesis topic from the provided list published in mano.vilniustech.lt information system or by their own preference.

1.2.5. Final theses (applied projects) comply with the requirements for the field and cycle

In the field of Production and Manufacturing Engineering, the final theses are designed to comply with the requirements for the study field and cycle (see Annexe 9.3). The preparation of Bachelor's theses involves incremental courses like "Final Thesis 1, 2, and 3" over semesters, which are assessed through intermediate reviews and ultimately evaluated by a Degree Awarding Commission (DAC). Master's theses integrate scientific research and applied innovation, as seen in courses like "Research and Innovation," guiding students to experimental studies and are validated through formal public defenses. This compliance includes adherence to regulations like the Law on Higher Education and Research of Lithuania, national and university-specific requirements, and international standards such as the EUR-ACE guidelines. For bachelor’s programs, projects focus on applying basic engineering concepts to practical problems, fostering a solid understanding of

foundational engineering principles. The requirements ensure that students can integrate their theoretical knowledge with practical applications, preparing them for entry-level engineering roles or further studies. At the master's level, projects are more research-oriented, involving original research, complex problem-solving, and defined innovation. Projects are evaluated by both academic supervisors and industry experts, providing students with comprehensive feedback on their work. This evaluation includes a defense presentation, where students must communicate their findings and justify their methodologies and decisions. Projects are developed in collaboration with industry partners, ensuring relevance to current industrial practices and challenges. However, the thesis topics are appointed in very early stage, when students are not fully aware, what is their interest, and while they have not passed any courses of the study programme yet.

ANALYSIS AND CONCLUSION (regarding 1.2.)

In general, study programmes comply with legal requirements. The programmes have appropriate elements included and have an overall good progression. Recommendations emphasize the shifting Responsibilities of Engineers: Engineers are increasingly expected to engage with broader issues beyond just technical and operational tasks. They must think about market trends, design considerations, and sustainability in product development. This change reflects the broader industrial shift from being purely technical to being able to consider holistic and multidisciplinary solutions design.
The quality of the reviewed final theses varied significantly. During discussions with industry representatives, the commission was informed about this variability in quality. The process for approving final theses, particularly within the Faculty of Mechanical Engineering, requires improvement to ensure consistency and maintain high standards.
Equal opportunities for all students in terms of access to important learning opportunities and engagement with the industry should be a priority for a better integration of international students.

AREA 1: CONCLUSIONS

AREA 1	**Unsatisfactory - 1** Does not meet the requirements	**Satisfactory - 2** Meets the requirements, but there are substantial shortcomings to be eliminated	**Good - 3** Meets the requirements, but there are shortcomings to be eliminated	**Very good - 4** Very well nationally and internationally without any shortcomings	**Exceptional - 5** Exceptionally well nationally and internationally without any shortcomings
First cycle				X	
Second cycle				X	

COMMENDATIONS

1. Good overall learning environment and learning progression in fundamental disciplines with the potential for deep specialization.
2. Bachelor's programmes comply with good international standards.
3. Good international and cross-faculty learning opportunities.

RECOMMENDATIONS

To address shortcomings
None

For further improvement

1. The bachelor programmes in the first cycle are well positioned and of good international quality (grade 4), comments below could be used to develop a high-quality setup further. The second cycle programmes could benefit from addressing some of the recommendations below to progress further towards the highest international standards.
2. Future-Oriented Focus:
   - For Automation and Robotics specifically: While there are relevant courses, there could be more emphasis on cutting-edge technologies in robotics, industrial metaverse, machine learning, and artificial intelligence in production systems. Cyber-Physical Systems and IoT (Internet of Things): These technologies are central to modern production systems, particularly in smart factories and Industry 4.0. Incorporating courses on networked production systems or cybersecurity for industrial systems would enhance the future-oriented aspect of the program. Some of these aspects can be drawn from a stronger integration with the Applied AI curriculum.

- For all programmes - Ensure equal opportunities for all students in terms of access to important learning opportunities and engagement with the industry should be a priority for a better integration of international students.
- For Systems Engineering:
  Incorporating systems engineering topics such as modelling and simulation, system lifecycle management, and optimization into both specialisations could provide a stronger theoretical and practical foundation for managing complex production systems. Additionally, courses on system integration and multidisciplinary collaboration would be valuable for preparing students to work on complex, interdisciplinary projects involving both engineering and management.

3. For all programmes- Sustainability:
   While not mentioned in the curriculum sustainability is becoming increasingly important in industrial practices, therefore integrating elements such as: design for sustainability/CE, sustainable materials & production technologies and resource conserving manufacturing processes could better align the programme with future industry needs.
4. For all programmes - Business-Technology Integration:
   While the programme already includes solid courses on management and production, a deeper integration of technology-driven business transformation (e.g., digital transformation in manufacturing, smart supply chain systems, data-driven decision-making) would align better with Industry 4.0 and the need for engineers who understand both the technical and strategic aspects of production.
5. For all programmes - Industry Collaboration:
   While the programmes already offer internship opportunities in the last year of bachelor study, offering more opportunities for industry-based projects or collaborations with companies on real-world challenges would ensure that students are better prepared for practical, hands-on problem solving in future production systems. Also, important to put additional attention to providing opportunities for international students.
6. For all programmes - Service and health care sectors.
   With the exception of Industrial Design, the curriculum is largely catering for manufacturing sectors, with the ongoing shift towards services and health care in economy, the programmes could be advised to extend the scope further into these sectors.

AREA 2: LINKS BETWEEN SCIENTIFIC (OR ARTISTIC) RESEARCH ANDHIGHER EDUCATION

2.1.	Higher education integrates the latest developments in scientific (or artistic) research and technology and enables students to develop skills for scientific (or artistic) research

2.1.1. Research within the field of study is at a sufficient level

The university ensures that its programmes align with current advancements in various fields, which is evident in their efforts to integrate cutting-edge topics such as Industry 5.0 technologies, artificial intelligence, robotics, and mechatronic systems. The university's curriculum and research activities are designed to foster an environment where students can develop strong research skills.

The university encourages student involvement in scientific research through practical training, project-based learning, and collaboration with industry partners. These efforts provide students with exposure to the latest technological trends and help them build the skills necessary for conducting independent and innovative research.

Faculty members actively involved in research bring their expertise and ongoing projects into the classroom. This direct transfer of new knowledge and real-world applications enhances the learning experience, ensuring that education is current and relevant. The university is part of various academic networks and collaborates with other institutions on research projects. This collaboration expands the research scope and resources available to students and faculty, fostering a broader academic exchange and enhancing the quality and impact of research. Participation in government-funded and EU-funded projects enables VILNIUS TECH to undertake ambitious research projects that might be beyond the scope of individual or internal funding. These projects often involve cutting-edge technology and significant scientific advancement. VILNIUS TECH’s research is supported by a mix of funding sources, including government grants, EU funding, industry partnerships, and internal university funds. The diversity of funding sources helps to stabilize financial support for ongoing and future research.

2.1.2. Curriculum is linked to the latest developments in science, art, and technology

The curriculum is indeed linked to the latest developments in science and technology. This connection is facilitated through the personal competencies of the teaching staff, who actively publish in scientific journals, participate in conferences, and engage in research and development projects. The report highlights that, between 2020 and 2023, the teaching staff and students collectively published numerous articles in reputable journals, ensuring that the content taught reflects current research and technological advancements.

Research activities at VILNIUS TECH are deeply integrated into the curriculum of Production and Manufacturing Engineering. Students engage in research-based projects and theses that are directly linked to the latest developments in the field. This integration ensures that students are not only recipients of knowledge but also contributors to the advancement of the field. The curriculum at VILNIUS TECH is regularly reviewed and updated to incorporate the latest scientific discoveries and technological advancements. This ensures that students are learning current concepts and using the latest tools and technologies in their fields. Faculty members are actively involved in research that contributes to advancements in their disciplines. This research directly influences the curriculum, as new findings and techniques are integrated into course content. VILNIUS TECH emphasizes the practical application of new technologies in its engineering programs. This includes the use of

advanced manufacturing technologies such as 3D printing, robotics, and automation systems within the curriculum. Students and faculty participate in national and international conferences and workshops, which helps in bringing the latest scientific discussions and technological innovations into the classroom environment.

2.1.3. Opportunities for students to engage in research are consistent with the cycle

Students have ample opportunities to engage in research activities that align with their level of study. The university emphasizes the integration of research into the curriculum, encouraging students to participate in scientific projects, contribute to publications, and present at conferences. These initiatives are designed to enhance students' research competencies and ensure that their academic experience is consistent with the expectations of their educational cycle.

VILNIUS TECH provide opportunities for students to participate in research projects. These opportunities are often a mandatory part of the curriculum, which helps students apply theoretical knowledge to practical problems, thus solidifying their learning and research skills. VILNIUS TECH has ties with the manufacturing and production industry, which facilitates joint research projects and internships. These partnerships provide practical benefits to students and help align the university's research activities with industry needs, ensuring that research is application-oriented and solutions-focused. In their final year, undergraduate students engage in capstone projects that require substantial research, often connected to real-world problems, and sometimes sponsored by industry partners. Master's students at VILNIUS TECH are required to complete a thesis based on original research, which is a significant component of their degree. This involves deep engagement with a specific research topic under the guidance of a faculty advisor. Graduate students often work as research assistants on faculty-led projects. This provides them with hands-on experience in conducting formal research and can sometimes include stipends or tuition waivers. The majority of intensive research activities are concentrated at the graduate level, where research forms a core component of the curriculum. Nearly all Master's students are involved in research projects as a degree requirement.

AREA 2: CONCLUSIONS

AREA 2	**Unsatisfactory - 1** Does not meet the requirements	**Satisfactory - 2** Meets the requirements, but there are substantial shortcomings to be eliminated	**Good - 3** Meets the requirements, but there are shortcomings to be eliminated	**Very good - 4** Very well nationally and internationally without any shortcomings	**Exceptional - 5** Exceptionally well nationally and internationally without any shortcomings
First cycle				X	
Second cycle			X		

COMMENDATIONS

1. VILNIUS TECH has effectively integrated cutting-edge technologies and methodologies into its curriculum, ensuring that students are proficient with modern tools and techniques such as CAD/CAM, robotics, and automation systems. This not only prepares students for the current demands of the industry but also positions them to lead in innovation.
2. The university has established robust partnerships with key industry players, which enhances the practical relevance of its programmes. These partnerships facilitate internships, guest lectures, and real-world project opportunities, enriching the student learning experience and ensuring that education is closely aligned with market needs.

3. VILNIUS TECH's efforts in internationalization, including a wide range of study abroad options and international research collaborations, enrich the educational experience and enhance the university's global reputation. This exposure prepares students for global careers and fosters a broader understanding of worldwide industry and cultural perspectives.

RECOMMENDATIONS

To address shortcomings

1. The approval procedure of the final thesis before the defense especially for the Faculty of Mechanics should be improved.
2. Especially for the second cycle, more focus could be put into system integration between operations technologies, IT and operational purposes.
3. More focus could be put into experimental usage of LAB facilities, especially with the second-cycle.

For further improvement

1. Invest further in digital learning tools and platforms to enhance the remote learning experience. This could include more interactive online resources, virtual labs, and simulations that can provide practical learning opportunities remotely.
2. While existing industry partnerships are strong, expanding collaborations with international companies and industries can give students a broader perspective and more diverse real-world experience.
3. Encourage faculty and students to explore a wider range of research topics, particularly those that address emerging global challenges like climate change, renewable energy technologies, and smart manufacturing processes.
4. Develop a more structured approach to alumni engagement to enhance mentorship programs, career networking opportunities, and potential funding sources for research and scholarships.
5. Further develop interdisciplinary courses that integrate business, ethics, and sustainability with engineering principles. This will prepare students to tackle complex problems that require a multifaceted approach in their future careers.
6. Improve support services for international students, including language support, cultural integration programmes, and specific academic advising, to ensure they fully benefit from their educational experience at VILNIUS TECH.

AREA 3: STUDENT ADMISSION AND SUPPORT

3.1.	Student selection and admission is in line with the learning outcomes

3.1.1. Student selection and admission criteria and procedures are adequate and transparent

The admission procedure is performed in accordance with the Act of the Ministry of Education, Science and Sports, as well as according to the internal rules of the university and the national Centralized Admission Information System. Students applying to the first cycle programmes should have completed secondary education and passed at least three state matriculation exams. The competitive score is calculated from the results of subjects and additional factors. Admission requirements, the range of studies offered, and career opportunities are publicly available on the university website and through other means. In second-cycle programs, applicants having higher education can be admitted. Admissions are formalized by the order of the Rector, while coordinated

for first-year entrants by the Admissions and Information Centre and by faculty Deans for advanced entries.

The academic performance of students within the university is high, reaching from 8.19 to 9.24 graduate averages out of 10, reflecting consistency in programme quality. VILNIUS TECH regularly monitors and mitigates risks. The university promotes its programmes through events like open days, fairs, and information activities, using close cooperation between academic staff, students, and administrative offices, targeting prospective students.

3.1.2. Recognition of foreign qualifications, periods of study, and prior learning (established provisions and procedures)

VILNIUS TECH has developed a recognition procedure for prior learning, foreign qualifications, and credits acquired in part-time studies or during the period of internship abroad. It is based on internal acts, such as the Description of Procedures for Recognition of Achieved Learning Outcomes, adopted in 2020, and the Description of the Procedure for the Organisation of Erasmus+ Mobility of Students for Studies and Internships of 2016. Legal acts and guidelines are publicly available on the university's website.

In 2015, VILNIUS TECH was granted the right to recognize academic qualifications acquired abroad. The International Study Centre and the Faculty of Mechanics coordinate the international admission and legalization of documents. The university provides a procedure for recognition of non-formal and informal learning, which involves candidates in proving at least two years of experience. The process would involve the preparation of a portfolio of learning outcomes, assessment by academic staff, and may include the awarding of up to 70% of the credits within the study programme. The aim is to make programmes more flexible, support lifelong learning, and recognize different forms of learning.

ANALYSIS AND CONCLUSION (regarding 3.1.)

The admission policy at VILNIUS TECH is transparent, in line with national requirements and internal university policy. In the first-cycle study programs, students should have a secondary education at school, with passed state matriculation exams. Student ranking is organised through competitive scores. The second-cycle programmes demand higher education qualifications. On different platforms, it provides accurate information on admission requirements, available study programmes, and job opportunities in each field. Students' academic performance is consistently high, which reflects the quality of the programmes. VILNIUS TECH also recognizes foreign qualifications, prior learning, and credits from internships or part-time studies, with detailed procedures in place for the validation of non-formal and informal learning, aiming to support flexible, lifelong learning.

3.2.	There is an effective student support system enabling students to maximise their learning progress

3.2.1. Opportunities for student academic mobility are ensured

VILNIUS TECH allows flexibility in students' academic pathways, allowing them to change their study programme, mode of study, funding, or take an academic leave. The academic mobility of students is based on the "Study Regulations" resolutions and the "Description of the Procedure for Organizing Erasmus+ Mobility for Studies and Internships". Students can change their study programme within the same academic cycle or transfer to another higher education institution, provided they have completed at least the first semester of their first year of study. With this flexibility, diverse academic

and professional development opportunities are supported. Students can tailor their educational experience to their needs.

3.2.2. Academic, financial, social, psychological, and personal support provided to students is relevant, adequate, and effective

VILNIUS TECH provides a comprehensive support system to its students in academic, financial, social, psychological, and personal areas. Academic support is ensured through the "Introduction to Studies" course for first-year students, mentorship programmes, and detailed resources on the Moodle platform. In addition, individual advice by faculty staff, career service, and annual events: "Career Days" and "VILNIUS TECH Graduates: 100 Perspectives" facilitate students' links to the labour market.

To address financial difficulties there are different scholarships, various social allowances, loans supporting students in need, reductions in tuition fees for current, high-achieving, non-funded students. There are extended individual advising, workshops, and staff advising students with disabilities or experiencing stress and psychological troubles. Besides, the university contributes to student life with various extracurricular activities and a Sports and Arts Centre. There is the "Redmine" system, which helps to resolve student problems quickly and makes student support effective.

3.2.3. Higher education information and student counselling are sufficient

VILNIUS TECH has a strong academic support and student counselling system. The Academic Support Centre at VILNIUS TECH arranges consultations and seminars in Lithuanian and English on career choice, internship, job search, and interview preparation. New students are introduced into the university through “Introduction to Studies” course. Academic support is provided by the Faculty, Deans' offices, central administration, student representatives. There is usage of multiple lines of communication - directly, electronically, and via social media. In addition to that, teaching staff also offer office hours consultations whose schedule can be found on Moodle, department websites, and notice boards. Students are also counselled before exams.

ANALYSIS AND CONCLUSION (regarding 3.2.)

VILNIUS TECH has flexible academic pathways: a student can change the study program, mode of study, or take academic leave; mobility is supported through the Erasmus+ programme and inter-institutional transfer. The university has a robust support system, meeting academic, financial, social, psychological, and personal needs for most students. Academic support is facilitated through mentorship, career services, and online resources. Financial support includes scholarships, loans, and tuition fee reductions. Personal and psychological support is organised through individual advising and workshops. The university also offers detailed student counselling, ranging from career guidance to exam preparation through various communication channels.

AREA 3: CONCLUSIONS

AREA 3	Unsatisfactory - 1 Does not meet the requirements	Satisfactory - 2 Meets the requirements, but there are substantial shortcomings to be eliminated	Good - 3 Meets the requirements, but there are shortcomings to be eliminated	Very good - 4 Very well nationally and internationally without any shortcomings	Exceptional - 5 Exceptionally well nationally and internationally without any shortcomings
First cycle				X	
Second cycle				X	

COMMENDATIONS

1. There is a well-established and functional collaboration between faculty administration and student representatives.

RECOMMENDATIONS

To address shortcomings

None

For further improvement

1. Due to an increasing number of international students and continuing research internationalization, lecturers should be encouraged to enhance their English levels.
2. Due to an increasing number of international students more resources should be available to study Lithuanian language.
3. There should be more established and functional career centre procedures for ensuring an efficient search of mandatory internships for students.

AREA 4: TEACHING AND LEARNING, STUDENT ASSESSMENT, AND GRADUATE EMPLOYMENT

4.1.	Students are prepared for independent professional activity

4.1.1. Teaching and learning address the needs of students and enable them to achieve intended learning outcomes

The teaching and learning methodologies are designed to meet students' needs and facilitate the achievement of intended learning outcomes. The university employs a student-centred approach, incorporating diverse instructional methods such as lectures, practical sessions, group projects, and independent research. This variety ensures that students can engage with the material in ways that suit their learning preferences. Additionally, the curriculum is regularly updated to reflect the latest developments in science and technology, providing students with relevant and up-to-date knowledge. Assessment methods are aligned with learning objectives, offering students clear feedback on their progress and areas for improvement. Overall, these strategies collectively support students in achieving the programme's intended learning outcomes.

4.1.2. Access to higher education for socially vulnerable groups and students with individual needs is ensured.

VILNIUS TECH has shown commitment to inclusiveness by supporting systems for students with disabilities, including physical accommodations on campus, financial aid, and specialized academic support, as well as staff training. Coordinator for Students with Disabilities provides services to all students with individual needs. More specifically, flexibility in assessments and availability of special help resources, such as counselling and accessible learning materials, contribute to equal access to all students. The involvement of both the university and outside sources, such as the National Study Fund, strengthens the support system for such students. It seems that the university is very open with regards to accessibility and inclusion, they maintain a tolerant and supportive academic environment.

ANALYSIS AND CONCLUSION (regarding 4.1.)

VILNIUS TECH applies student-centred teaching and learning methods, using various approaches through lectures, practices, and self-studies. The study programme is reviewed regularly regarding the scientific and technological novelties. Assessment shall be designed according to objectives to provide productive feedback. The university is committed to inclusivity through support to socially vulnerable groups and students with disabilities. It does so through a variety of means: physical, financial, assessment flexibility, counselling, and accessible materials. A dedicated disability coordinator and collaboration with external resources, such as the National Study Fund, reinforce its tolerant and supportive academic environment.

4.2.	There is an effective and transparent system for student assessment, progress monitoring, and assuring academic integrity

4.2.1. Monitoring of learning progress and feedback to students to promote self-assessment and learning progress planning is systematic

The monitoring of student learning progress and the provision of feedback are systematic. The university employs a structured approach to evaluate students' progress through cumulative assessments, semester analysis, and feedback mechanisms to help students with self-assessment and planning of their learning progress. The results of examinations and other assessments are reviewed, and if discrepancies are noted, targeted interventions such as discussions with students and faculty are organized to identify and address the causes of underperformance.

4.2.2. Graduate employability and career are monitored

There is a systematic procedure in place orchestrated by the university management towards graduates employability and career tracking. University is quite involved into employability of graduates and there are 3 parallel systems to monitor employability:

1. Government Strategic Analysis Centre (Lith. Vyriausybės strateginės analizės centras, STRATA);
2. Lithuanian Public Employment Service under the Ministry of Social Security and Labour.
3. University internal system of alumni and employers' questionaries.

The most informative and useful is internal university employability and career monitoring system providing various information obtained mainly from two different sources: alumni's and employers. In SER clear and useful information about employability of graduates per various perspectives is given:

- per study programme;

- per year;
- per field of employer company;
- per graduate position in the company;
- per time spent to get employed after being graduated;
- per graduates' assessment of their readiness for the labour market after graduation;
- per graduates' perceived value of their profession in the labour market;
- per involvement of social partners and employers in the study process;
- per graduates' perception of their current situation in the labour market compared to expectations (this is very important)

4.2.3. Policies to ensure academic integrity, tolerance, and non-discrimination are implemented

The university has implemented policies to ensure academic integrity, tolerance, and non-discrimination. These policies are part of the institution's commitment to creating an inclusive, fair, and ethical academic environment. The report outlines measures for preventing plagiarism, promoting respect among students and staff, and fostering an academic culture that values integrity and inclusivity.

4.2.4. Procedures for submitting and processing appeals and complaints are effective

The procedures for submitting and processing appeals and complaints are effective. The university follows the “Description of procedures for resolving student appeals and complaints” which ensures that appeals related to assessments and complaints regarding university administration are addressed systematically. Appeals are directed to either the Faculty or University Appeals Commission, which examines cases of violations and ensures fair resolution. The report notes that these procedures were utilized effectively between 2021 and 2023, with no formal appeals reported but six student complaints received and processed according to the set procedure.

ANALYSIS AND CONCLUSION (regarding 4.2.)

The discussion with students and teachers confirmed that the system for student assessment, progress monitoring, and ensuring academic integrity is both effective and transparent. There is a serious approach of university management to the graduate employability and career tracking process. The university has implemented policies to ensure academic integrity, tolerance, and non-discrimination. The procedures for submitting and processing appeals and complaints are effective.

AREA 4: CONCLUSIONS

AREA 4	Unsatisfactory - 1 Does not meet the requirements	Satisfactory - 2 Meets the requirements, but there are substantial shortcomings to be eliminated	Good - 3 Meets the requirements, but there are shortcomings to be eliminated	Very good - 4 Very well nationally and internationally without any shortcomings	Exceptional - 5 Exceptionally well nationally and internationally without any shortcomings
First cycle					X
Second cycle				X	

COMMENDATIONS

1. VILNIUS TECH has an excellent graduate career-monitoring system.

2. There is a systematic procedure in place orchestrated by the university management towards graduates' employability.

RECOMMENDATIONS

To address shortcomings

None

For further improvement

1. The university should make efforts to solve the problem of foreign students' lack of experience and employment opportunities, which it sees as a result of their lack of Lithuanian language skills.

AREA 5: TEACHING STAFF

5.1.	Teaching staff is adequate to achieve learning outcomes

5.1.1. The number, qualification, and competence (scientific, didactic, professional) of teaching staff is sufficient to achieve learning outcomes

The faculty counts a large and well-balanced portfolio of 130 staff members (18 professors, 59 associate professors, 49 lecturers, 4 assistants). There is a large number of staff at all levels engaged in the programs, with a ratio above 1 faculty to 3 students, it seems almost exceedingly high, and with an even better ratio for second cycle it certainly seems that the domain is well supported. It raises the question of how the numbers are calculated as well as if teaching engagements may suffer from lack of focused efforts/commitments. In terms of coverage of teaching by permanent staff it is 64% for the first and 68% for the second cycle, which is good as long as the staff in secondary positions are systematically (re)qualified and as long as staff members in a permanent position secure adequate progression and coordination in the study. One the positive side it may, however, also provide the link to the environment and provide a constant flow of new inputs. The increased commitment of senior staff to second cycle studies also seems appropriate, the coverage of senior staff in the first cycle also seems appropriate.

Formal legal requirements are met with 91% of teaching delivered by staff holding a PhD and professors carrying above 30% of teaching engagements.

The age distribution in the teaching staff is well balanced, which makes promises for the longer-term viability of the programs. From the SER it also reads that career paths are available for PhD into career positions (2 of 5 have continued in the evaluation period), 22 PhDs are enrolled at the time of evaluation.

The faculty members are research active and engage in international research networks. The publication portfolio is dominated by local outlets and a recommendation would be to target more top 25% outlets as per SCOPUS and in general for staff members to increase their FWCI. A concern could be with the domain of management engineering, represented in the studies Production & Management Engineering and Industrial Engineering.

ANALYSIS AND CONCLUSION (regarding 5.1.)

Although the staff/student ratio by all accounts is positive, questions have to be raised about depts of engagement and ownership for the particular studies.

A point of concern could be that more than 30% is covered by staff in secondary positions and by staff from other faculties. Cross-faculty engagement and coordination in the courses offered outside their own primary domain/position was mentioned as a challenge by staff and students alike. More attention should be put into ensuring appropriate coordination and service to the students.

Industrial and Management Engineering seems to play a marginal role in the profile of the faculty. There seems to be a good tradition for engaging students in research and joint publication - a point of attention should be to target higher ranking outlets and impact (research community and to practice).

5.2.	Teaching staff is ensured opportunities to develop competences, and they are periodically evaluated

5.2.1. Opportunities for academic mobility of teaching staff are ensured

Supported by **ERASMUS+** and other similar mobility programmes, teaching staff have access to opportunities for **international mobility**. Mobility activities count both visits with a primary teaching objective and visits with a primary research objective. Number of staff participating it at a satisfactory level, although it would have been appropriate to include details about the duration of the visits. The geographical spread is also good and many relationships are reported in the SER. A concern here could be the depth of inspiration, which given **the large number of relationships may not be fully conducive to a coherent and systematic body of knowledge**. From the SER it is not clear if strategic partners for import teaching agendas have been identified or systematically used for teaching development.

5.2.2. Opportunities for the development of the teaching staff are ensured

The group of **Educational Competencies**, which is part of the Academic Support Center, provides training and support to develop pedagogical and didactic competencies. They design and distribute a course catalogue; staff are as part of the career path required to document their participation. For new staff members a compulsory seminar is offered. Within the first three years of employment, it is required that staff participate in a “professional internship”. Up-to 2 months stays are supported by VILNIUS TECH and the staff member is exempt from normal responsibilities. During the visit management expressed that problem-based learning will serve as a key learning philosophy for the faculty and measures have been taken to integrate it in teaching and staff capability development. Teaching staff also recognised this and gave examples of how it had been adopted.

Staff members agree that they have good opportunities for further development. There seems to be a clear understanding and systematic support for career development and an elaborate qualification system has been established and is well understood by staff.

ANALYSIS AND CONCLUSION (regarding 5.2.)

The faculty clearly has good facilities and opportunities for further development. It could be recommended that preferred mobility partners from where excellence inputs could be derived are identified and relationships nurtured to ensure a systematic input on important teaching development agendas. Participation in centres of excellence could be improved, many relationships are reported, but strong inputs could be gained from looking to leading institutions in the domain.
English as a working language could be further strengthened, but the level is generally good.

AREA 5: CONCLUSIONS

AREA 5	**Unsatisfactory - 1** Does not meet the requirements	**Satisfactory - 2** Meets the requirements, but there are substantial shortcomings to be eliminated	**Good - 3** Meets the requirements, but there are shortcomings to be eliminated	**Very good - 4** Very well nationally and internationally without any shortcomings	**Exceptional - 5** Exceptionally well nationally and internationally without any shortcomings
First cycle				X	
Second cycle				X	

COMMENDATIONS

1. Excellent opportunities for development.
2. Good research environment supported with labs and projects with international partners.

RECOMMENDATIONS

To address shortcomings

None

For further improvement:

1. More focused mobility and development partnerships could be established to support a more consistent flow of inputs to the development of teaching and learning competencies and capabilities.
2. It could be recommended that more efforts are put into the establishment of a core group holding responsibility for programmes development and coordination, and for supporting increased ownership for the programmes by core teaching staff and ensuring better coordination with staff in secondary positions.

AREA 6: LEARNING FACILITIES AND RESOURCES

6.1.	Facilities, informational and financial resources are sufficient and enable achieving learning outcomes

6.1.1. Facilities, informational and financial resources are adequate and sufficient for an effective learning process

During the visit the evaluation committee had the opportunity to visit Labs and learning facilities. The faculty is based in a new building equipped with modern learning facilities. Appropriate facilities are provided for staff and students, this includes both teaching rooms, work/study space, social space, LAB facilities, library, and IT infrastructure. The facilities support a strong instructive environment where students can learn important foundations of their profession. We also saw some elements of more experimental lab work, although this element could be further strengthened e.g. by putting more attention to the integration of OT, IT and operational purposes.

An important element of the programmes is the opportunity to gain practical experience through internships and general engagement with industry and partners from the environment. Here there seems to be an opportunity gap between local and European students and candidates from the rest of the world; and also between best in class students and lower end students. Industrial partners are

by their own account keen to receive the best candidates but are reluctant to offer opportunities for candidates with lower skills or who do not command the language.

6.1.2. There is continuous planning for and upgrading of resources.

During the visit the committee saw updated and modern facilities throughout. From the SER investment plans and upgrading resources seems to be appropriate, but it is likely a continuous struggle to keep such wide-ranging facilities upgraded. To support this purpose the committee saw how partnerships with technology providers were established and how ongoing projects helped to finance and activate investments in Labs and other facilities.

ANALYSIS AND CONCLUSION (regarding 6.1.)

Significant investments have been made to upgrade/establish a strong infrastructure. However, it is not mentioned when the investments in new computers etc. was made and since the clock-speed is quite high on eg. electronics, software, sensors, robots, lasers etc., obsolescence may be a source of concern. During the visit the expert committee was informed about how research projects and collaboration with technology providers secure an ongoing upgrading of equipment. Another concern is related to, how and to which degree LAB facilities are utilised by the students, and how they are linked to experimental and research-based thesis project work, which moves beyond the instructive capabilities for which the facilities are mainly designed.
More support to students at all levels and backgrounds could be provided to support that all students have equal access to learning opportunities and in particular industrial engagement.

AREA 6: CONCLUSIONS

AREA 6	**Unsatisfactory - 1** Does not meet the requirements	**Satisfactory - 2** Meets the requirements, but there are substantial shortcomings to be eliminated	**Good - 3** Meets the requirements, but there are shortcomings to be eliminated	**Very good - 4** Very well nationally and internationally without any shortcomings	**Exceptional - 5** Exceptionally well nationally and internationally without any shortcomings
First cycle					X
Second cycle				X	

COMMENDATIONS

1. New and modern facilities.
2. Excellent design of Labs for instructive learning.

RECOMMENDATIONS

To address shortcomings
None

For further improvement

1. In the Labs, more focus could be put into system integration between operations technologies, IT and operational purposes, especially for the second-cycle but also in the first cycle as a future prospect.
2. More focus should be put into experimental usage of LAB facilities, especially with the second cycle, also for the welding field.

3. The university is encouraged to foster equal opportunities for all students, embracing diversity in skill levels and nationalities.

AREA 7: QUALITY ASSURANCE AND PUBLIC INFORMATION

7.1.	The development of the field of study is based on an internal quality assurance system involving all stakeholders and continuous monitoring, transparency and public information

7.1.1. Internal quality assurance system for the programmes is effective

The quality of the study process at VILNIUS TECH is maintained by implementing a set of approved regulations (24), including Description of internal study quality assurance of Vilnius Gediminas Technical University (2020) and Quality Management System Guidelines of Vilnius Gediminas Technical University (2018). One of the main bodies responsible for the study programme quality is Study Programme Committee (SPC) which is composed of the Faculty and Department representatives, as well as social partners and the students' representatives.
All information related to the implementation of the programme is stored in the VILNIUS TECH information system "Alma Informatika2". At the start of the 2023-2024 academic year, the VILNIUS TECH Analitika/Power BI quality monitoring system was launched, granting SPC Chairs access to its data. This system provides and tracks analytical information, including general data, student enrolment by funding type, student performance trends, and dropout rates. VILNIUS TECH Analitika/Power BI is currently in the testing phase.

7.1.2. Involvement of stakeholders (students and others) in internal quality assurance is effective

The survey of social partners was carried out by the Self-Evaluation group in January-February 2024 and included 15 respondents. An annual round table discussion is organized with business representatives during the VILNIUS TECH “Career Days”, during which they express their needs, recommendations, and suggestions, which contributes to the improvement of study programmes.
Social partners and employers are involved in evaluation of the graduate’s employability and career tracking process by participating in survey studies conducted by the study administration. Data from questionaries looks yearly well processed and provided in SER per various perspectives:

- satisfaction with the competencies acquired;
- social partners' opinion about the level of graduates;
- social partners' opinion about graduates have practical professional skills;
- social partners’ opinion about graduates’ personal and social skills;
- social partners' willingness to accept students for internships;
- social partners' opinion on VILNIUS TECH graduates as the first choice while looking for new employees.

Another good university initiative, that positively impacts graduates’ employability are also observed:

1. First, “VILNIUS TECH Graduates: 100 Perspectives“ annual event, which is organised to help graduates step into the labour market, find their competitive edge, and facilitate companies in finding young, talented and enthusiastic employees.
2. Secondly, “VILNIUS TECH Digital Badge System”, which represents an innovative approach to education. It encourages students to participate in various activities, conferences, and seminars and develop as both specialists and individuals, which is then recognised by the university. These badges serve as evidence of students' competencies and strengths to potential employers.

There are 3 companies providing scholarships for advanced students. This is very encouraging for students and helps employers to link graduates to future jobs.

7.1.3. Information on the programmes, their external evaluation, improvement processes, and outcomes is collected, used and made publicly available

VILNIUS TECH makes the aims and outcomes of its study programmes accessible to prospective students and partners via the university's website, internal systems, and other platforms such as AIKOS and LAMA BPO. The internal system of the university, is vilniustech.lt, manages study programmes, student data, and performance, aiding in curriculum adjustments and academic planning. It also conducts student, faculty, and employer surveys to collect feedback on the study programmes and teaching methods for improvement. The results of the surveys are publicly available for the students on the mano.vilniustech.lt portal. It displays aggregated feedback and actions taken by the university. Regular feedback meetings and surveys monitor student progress, detect problems, and adapt the study process accordingly.

7.1.4. Student feedback is collected and analysed

If negative trends emerge from the surveys, additional actions may be initiated: interviews with lecturers by the psychologist of the Academic Support Centre and the staff of the Educational Competences Group, additional lecture observations followed by personal feedback to the lecturer on his/her work with students and advice on how to improve the lecturing and contact with students, and the offer of thematic training.

ANALYSIS AND CONCLUSION (regarding 7.1.)

The employability of graduates is excellent, as there is a strong demand for mechanical engineering specialists in Lithuania. Employability is well-tracked and monitored from various perspectives. However, information about graduate employability should be made publicly accessible on the VILNIUS TECH website. Highlighting the high employability rates and successful careers of graduates could attract more students to this study field, especially given that the low enrollment numbers in this area have become a state-level concern.
During the preparation of the SER, the Self-Assessment Group conducted a survey of social partners. However, the number of respondents appears insufficient for this field of study, particularly considering that discussions with industry representatives revealed a persistent shortage of specialists. Cooperation with stakeholders should be strengthened and carried out systematically and consistently. Additionally, establishing strategic partnerships with larger companies (major players) is recommended to enhance internship and employment opportunities for all students, including international students.
An interdisciplinary study experience or programmes developed in collaboration with other faculties are central to modern education. However, communication issues between the involved faculties were noted during the expert visit. Similar problems were evident in the prepared materials, particularly in the English version of the SER (several parts were provided in Lithuanian only). Effective coordination and consistent communication between structural units and persons involved are critical for quality control. These obstacles to seamless communication should be addressed and eliminated in the future.
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AREA 7: CONCLUSIONS

AREA 7	Unsatisfactory - 1 Does not meet the requirements	Satisfactory - 2 Meets the requirements, but there are substantial shortcomings to be eliminated	Good - 3 Meets the requirements, but there are shortcomings to be eliminated	Very good - 4 Very well nationally and internationally without any shortcomings	Exceptional - 5 Exceptionally well nationally and internationally without any shortcomings
First cycle				X	
Second cycle			X		

COMMENDATIONS
None

RECOMMENDATIONS
To address shortcomings
None

To address shortcomings

1. The university needs to improve cooperation between the administration of the involved structural units in ensuring the quality of study programmes, including in organizing such an important process as self-assessment, by organizing regular meetings in which issues are considered on their merits.
2. Better coordination with teaching staff from other faculties or external joint programme partners is also recommended.
3. The cooperation with stakeholders needs to be ameliorated and performed on a systematic and regular basis. The regular meetings with industry representatives should be organized in a planned and well-structured manner (for example, by marking the meeting calendar and the range of issues to be discussed in advance).
4. Strategic partnerships with larger companies (major players) are suggested to improve internship and employability opportunities for all types of students (also for international students).
5. Regular feedback and industry surveys should be organized once per year not only before the external accreditation. It is necessary to show industry representatives that providing regular feedback is an opportunity to participate in improving the quality and content of study programmes.

For further improvement
1. It is recommended that the university make employability data easily accessible to prospective students on its website.
2. Since the university places great emphasis on attracting international students, their opinions should also be monitored to maintain high levels of satisfaction with their studies and to ensure internationally recognized prestige.

V. SUMMARY

Learning Facilities: Appropriate and updated learning facilities are available to the students. Labs are updated and well equipped especially for instructive learning and single standing technologies (welding, CNC, robots etc.). Labs especially in the second cycle, could benefit from the ability to work with system integration, IT/OT interaction, production flows, and issues pertaining to the industrial metaverse.

Student admission and support: Both for local and international students, the application and admission process is straightforward and transparent. There is a functional collaboration between the students and faculty administration. Although students have access to quality learning resources, more efforts should be made towards international student support and more functional internship search support.

Industrial engagement: Although company visits and academic internships are part of the program, increasing the industrial engagement throughout the studies would benefit employability and the ability of students to relate taught material to practical capabilities and requirements. Advancing equal learning opportunities to all students should be a priority of the faculty.

Teaching staff: are well qualified for supporting the programmes and programme relevant research is undertaken and connected to the studies and study activities. Mobility and development opportunities are generally well structured and available, but a more focused approach to support more directly learning philosophies and strategies, could be suggested.

Employability: The outcomes for graduates' employability are excellent. It's well tracked and monitored in various perspectives. Their employability itself is excellent and they are satisfying the need for mechanical engineering specialists in Vilnius region and outside the region. Experts team would encourage the university to make this data about employability accessible for future students on university website.

Quality Assurance: There is well developed quality assurance system in the university in place. The university organizes feedback through various surveys involving both students, thereby demonstrating its commitment to ensuring ever-higher study quality. However, the cooperation and feedback from industry should be organised on more systematic basis. As the university actively operates on the international stage and attracts foreign students, greater efforts should be made to understand their perspectives and develop skills that enable them to integrate into the university's activities. Additionally, this would facilitate opportunities for internships in companies and improve their employment prospects.
It is a very supportable idea to organize interdisciplinary study programmes in cooperation with other faculties, however, during the visit and also after the study materials were prepared, problems were observed in quality control and daily communication between involved structural units, which should be eliminated in the future.

VI. EXAMPLES OF EXCELLENCE

1. Lab facilities are very well suited for instructive learning facilitation, which is especially a stronghold in the first cycle studies.
2. Organizing study programmes with foreign universities allows students to acquire versatile skills that will increase their competitiveness in the labour market, thus also the quality of the study programmes.