



**STUDIJŲ KOKYBĖS VERTINIMO CENTRAS
CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION**

**CHEMICAL ENGINEERING FIELD OF STUDY
KAUNAS UNIVERSITY OF TECHNOLOGY
EXTERNAL EVALUATION REPORT**

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CONTENTS

I. INTRODUCTION	3
1.1. OUTLINE OF THE EVALUATION PROCESS	3
1.2. REVIEW PANEL	4
1.3. SITE VISIT	4
1.4. BACKGROUND OF THE REVIEW	5
II. STUDY PROGRAMMES IN THE FIELD	7
III. ASSESSMENT IN POINTS BY CYCLE AND EVALUATION AREAS	8
IV. STUDY FIELD ANALYSIS	9
AREA 1: STUDY AIMS, LEARNING OUTCOMES AND CURRICULUM	9
AREA 1: CONCLUSIONS.....	16
AREA 2: LINKS BETWEEN SCIENTIFIC (OR ARTISTIC) RESEARCH AND HIGHER EDUCATION	17
AREA 2: CONCLUSIONS.....	21
AREA 3: STUDENT ADMISSION AND SUPPORT	22
AREA 3: CONCLUSIONS.....	24
AREA 4: TEACHING AND LEARNING, STUDENT ASSESSMENT, AND GRADUATE EMPLOYMENT	25
AREA 4: CONCLUSIONS.....	28
AREA 5: TEACHING STAFF.....	29
AREA 5: CONCLUSIONS.....	31
AREA 6: LEARNING FACILITIES AND RESOURCES	32
AREA 6: CONCLUSIONS.....	34
AREA 7: QUALITY ASSURANCE AND PUBLIC INFORMATION.....	34
AREA 7: CONCLUSIONS.....	37
V. SUMMARY	39
VI. EXAMPLES OF EXCELLENCE	40

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:

Panel chair: Prof. Dr. Barbara Hinterstoisser, Professor at BOKU University, Department for Natural Sciences and Sustainable Resources, Institute of Physics and Materials Science, Vienna (Austria);

Prof. Dr. Michael Morris (member of the academic community), Director AMBER Research Centre, and Professor of Surface Chemistry at Trinity College Dublin, The University of Dublin (Ireland);

Assoc. Prof. Dr. Blaž Likozar (member of the academic community), Associate professor, research professor and head of the Department of Catalysis and Chemical Reaction Engineering senior research associate at National Institute of Chemistry (Slovenia);

Dr. Milda Petrulevičienė, (representative of social partners) Senior Research associate at Center for Physical Sciences and Technology Department of Chemical engineering and technology (Lithuania);

Džiugas Vyšniauskas, (student's representative) Second-year graduate student of the Life and Chemical Physics program at the Faculty of Physics, Vilnius University (Lithuania);

1.3. SITE VISIT

The site visit was organised on 10 of November 2025 onsite.

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

- Senior management and administrative staff of the faculty(ies);
- 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

Kaunas University of Technology is a public institution which was established in 1922. Its competitive, international and interdisciplinary institution, which generates and transfers new knowledge and innovations. The University has 9 faculties (Chemical Technology; Civil Engineering and Architecture, Electrical and Electronics Engineering, Informatics; Mathematics and Natural Sciences; Mechanical Engineering and Design; Panevėžys Faculty of Technologies and Business; School of Economics and Business; Social Sciences, Arts and Humanities and), 8 institutes (Architecture and Construction; Biomedical Engineering; Environmental Engineering; Food; Health Telematics Science, Materials Science; Mechatronics and Prof. K. Baršauskas Ultrasound Research Institute) and 9 research centers. The Research - based study programmes of KTU are developed in cooperation with all stakeholders to guarantee a sustainable partnership of Science, business and industry: teachers, researchers, students and business partners. KTU offers studies in 42 study fields in groups of study fields of mathematics, informatics, physical sciences, engineering, technology, health, social sciences, education, humanities, arts and business and public management. KTU is the founder of two integrated centres of research, studies and business. Furthermore KTU has established a National Innovations and Entrepreneurship Centre and has established an Artificial Intelligence Excellence Centre. From the 1920s on KTU graduated more than 157000 students.

Kaunas University of Technology (KTU) is ranked in the 401–450 band globally for chemical engineering by the QS World University Rankings. In related subject rankings, KTU was in the 451-500 band for engineering and technology and the 801–1000 band for engineering in the Times Higher Education (THE) rankings for 2025. In the Times Higher Education (THE) 2025 subject rankings for Engineering, KTU is placed in the 801–1000 band overall.

The university is well respected internationally and U.S. News & World Report's Best Global Universities rankings placed KTU at 1199 in Engineering (overall). The QS World University Rankings 2026 placing it in the 741–750 band. Other rankings include U.S. News & World Report ranks it 1624 globally, 528 in Europe, and 2 in Lithuania. The Times Higher Education World University Rankings 2026 places it in the 1001–1200 range, while the Center for World University Rankings (CWUR) places it 1948 out of 21,462 universities for 2025.

Overview of the study field

The Faculty of Chemical Technology (CTF) implements studies in the field of chemical engineering at the University. The CTF of KTU provides bachelor's, master's and doctoral studies and research in the fields of chemistry, chemical engineering, food technology, biotechnology and environmental engineering. CTF participates in various international networks, associations and organisations: the COST network, the American Chemical Society, the European Materials Research Society, the International Association of Engineers, etc. There are 2 study programmes in the field of Chemical Engineering at KTU. CTF organises 1st - cycle programme Chemical Technology and Engineering (since 2023 a double - degree study programme, implemented together with Technical University of Cartagena (Universidad Politécnica de Cartagena) (Spain)) and 2nd - cycle programme Chemical Engineering. The mission of KTU CTF is to become and remain a leading national scientific and educational institution, preparing highly qualified specialists for the chemical industry and conducting high quality and relevant international research in the fields of chemistry, chemical engineering, food technology, biotechnology and environmental engineering. CTF collaborates with more than 400 foreign research and academic institutions and business enterprises. In 2023, 923 papers were published in peer - reviewed scientific journals or conference proceedings; 622 of them in scientific

journals with an impact factor indexed in the Clarivate Analytics Web of Science or Elsevier Scopus databases (data of 10-07-2024). KTU scientists and other researchers implemented 87 international projects (12 projects under Horizon 2020, 29 projects under the EU Framework Programme for Research and Innovation "Horizon Europe", 3 projects under the EU Research and Training Programme "Euratom", 2 projects under the EU Digital Europe Programme, 41 projects under other programmes). In 2024, the University's scientists and researchers participated in 71 COST activities and 158 national research and innovation projects were implemented.

Previous external evaluations

The provided SER includes informative tables presenting expert recommendations from previous evaluation for the areas 1-7, which are the subject of this evaluation report, and the related actions taken by the University. These actions are taken into account and verified by the external evaluation panel of the present evaluation. The previous evaluation states that the study results must be reformulated in accordance with the EU's Bologna recommendation, and the workload for students and teachers must be clearly balanced.

Given the considerable overlap between the two existing bachelor's programs, these should be merged, at least in part. It was recommended that the bachelor's and master's programs be closely linked. Another recommendation is to enable cross-group research activities in order to improve practical skills. The proportion of master's theses developed in an industrial environment should be increased.

In addition, the relationship between theoretical and practical training, the implementation of knowledge about new technologies, and the involvement of stakeholders is an issue that should be focused on. Information dissemination and public relations work with future employers about the values of the program should be strengthened. Improving quality assurance is highlighted as very important. A clear and structured administrative approach to the development of bachelor's and master's degree programs must be linked to the faculty's strategic plan.

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*
 - o *10 Bachelor thesis (from 2022 to 2024)*
 - o *10 Master thesis (from 2022 to 2024)*
- *Legal Acts*

Additional sources of information used by the review panel:

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

- <https://en.ktu.edu/university/>
- Google Scholar and Scopus to assess international impact of research
- Time Educational Supplement and QS University rankings for Universities

II. STUDY PROGRAMMES IN THE FIELD

	First cycle/LTQF 6	Second cycle/LTQF 7
Title of the study programme	Chemical technology and engineering	Chemical Engineering
State code	6121EX019	6211EX020
Type of study (college/university)	University studies	University studies
Study cycle	First cycle	Second cycle
Mode of study (full time/part time) and nominal duration (in years)	Full-time Studies (4 yr.)	Full-time Studies (2 yr.)
Workload in ECTS	240	120
Award (degree and/or professional qualification)	Bachelor of Engineering Sciences	Master of Engineering Sciences
Language of instruction	Lithuanian, English	Lithuanian, English
Admission requirements	High school education See subsection 3.1.	Higher (Bachelor's degree or equivalent) Bachelor's qualification
First registration date	1997-05-19	2011-06-27
Comments (including remarks on joint or interdisciplinary nature of the programme, mode of provision)		

III. ASSESSMENT IN POINTS BY CYCLE AND EVALUATION AREAS

The **first cycle** of the *chemical 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	5
3.	Student admission and support	5
4.	Teaching and learning, student assessment, and graduate employment	5
5.	Teaching staff	5
6.	Learning facilities and resources	4
7.	Quality assurance and public information	4
Total:		32

The **second cycle** of the *chemical 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	5
3.	Student admission and support	5
4.	Teaching and learning, student assessment, and graduate employment	4
5.	Teaching staff	5
6.	Learning facilities and resources	5
7.	Quality assurance and public information	4
Total:		32

1,2*

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.

2

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
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FACTUAL SITUATION

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

There are 2 study programmes in the field of Chemical Engineering in the faculty of Chemical Technology (CTF) at KTU. CTF organises 1st cycle programme Chemical Technology and Engineering and 2nd cycle programme Chemical Engineering. Chemical Engineering Study Programmes Committee is responsible for the quality and implementation of study programmes in the field of Chemical Engineering of KTU CTF.

The aim of the 1st cycle programme is to provide competences in the analysis and design of chemical engineering products and processes based on the principles of safety, efficiency and sustainability by applying the knowledge of natural sciences, mathematics, engineering, business and management, humanities and social sciences in various technologies of the chemical industry.

Graduated students of the 1st cycle Chemical Technology and Engineering programme are able to work in positions such as engineers, technologists, project managers or other specialists in the chemical industry, design institutions, analytical laboratories as well as experts, consultants. Graduates students can continue their studies in second cycle or can work in Lithuanian companies such as: AB "Roquette Amilina", AB "Achema", AB "Orlen Lietuva", UAB "Littelfuse", UAB "NEO GROUP", AB "Lifosa", AB "Akmenės cementas", UAB "KB Components", UAB "Orion global PET", UAB "MARS Lietuva", UAB "Holister Lietuva", UAB "Ignitis renewables", UAB "Klaipėdos kartonas", UAB "Ignitis gamyba", UAB "Kauno stikas", UAB "Continental Automotive Lithuania" and others.

SER Appendix No. 2 contains a list of final theses for the first cycle study programme 6121EX019 Chemical Technology and Engineering for 2022-2024, most of which are related to nitrogen products, ceramics, crude oil, plastics production, processing, etc. A total of 79 theses were defended in 2022-2024. Only a few of them were related to sustainable energy technologies, so it would be advisable to take future topics into account in line with the EU and Lithuanian strategy.

The aim of the 2nd cycle programme is to provide chemical engineering research-based knowledge and design and research work skills that allow using experiments, design and modeling computer programs to solve chemical engineering practical problems, implement new technologies, and increase the innovativeness of the chemical industry.

Graduates of 2nd study programmes can manage companies, work as managers of lower-level departments, manage innovations in companies, interdisciplinary teams, projects of various types and scales, as well as develop and implement strategies for upgrading the technologies in companies, consult companies on technological development and optimisation of technological processes as well as work in research and development. They can also start a business or continue with doctoral studies. Graduates of second cycle programmes usually already have jobs during their studies, so after completing their studies they often stay at the same workplaces for a while but take higher positions due to the acquired new competencies. Master's graduates who have completed

second cycle of the Chemical Engineering programme are currently working in companies: AB "Roquette Amilina", AB "Achema", AB "Orlen Lietuva", UAB "Littelfuse", UAB "NEO GROUP", AB "Lifosa", AB "Akmenės cementas", UAB "KB Components", UAB "Orion global PET", UAB "MARS Lietuva", UAB "Holister Lietuva", UAB "Ignitis renewables", UAB "Klaipėdos kartonas", UAB "Ignitis gamyba", UAB "Kauno stikas", UAB "Continental Automotive Lithuania" and others.

SER Appendix No. 2 contains a list of final theses for the Second cycle study programme 6211EX020 Chemical Engineering 2022-2024, most of which are related to the synthesis and processing of nitrogen products, ceramics, plastics, etc. A total of 65 theses were defended in 2022-2024. Several of them were related to materials for catalysis, purification systems, and renewable resources, so the recommendation would be to expand the range of theses related to sustainable and renewable technologies, taking into account the EU and Lithuanian strategies.

KTU CTF highlights that the objectives, outcomes and content of the study programmes in the field of Chemical Engineering are based on long - term European Union (EU) and national strategies, the prospects for the development of society, the standards of professional associations and the needs of the labour market and students. The purpose of the EU's strategic documents is to set directions for developing the Chemical Engineering study field by outlining key priority areas. For instance, the European Commission's Action Plan on Synergies between Civil, Defence and Space Industries- specifically part 5, which focuses on critical technologies and technology roadmaps-highlights several sectors relevant to Chemical Engineering. These include Manufacturing (advanced materials and sustainable material design), Health (chemical, biological, radiological, and nuclear technologies), and **Energy (covering energy storage, resilience, renewables, hydrogen, and nuclear energy)**. From these technological priorities, the essential competencies of the field can be defined as the ability to design and develop chemical technologies, products, and processes that are safe, efficient, and sustainable. Lithuania's vision for the future "Lithuania 2050" follows EU strategies highlighting sustainability and innovation of the chemical industry.

The goals and outcomes of the Chemical Engineering study programmes are designed to prepare students for the future job market. They focus on skills such as evaluating and applying chemical engineering solutions with attention to sustainability, the circular economy, environmental protection, and workplace safety; combining knowledge of mathematics and natural sciences to improve processes or create new products; and performing engineering tasks that follow ethical, environmental, digital, and commercial principles. The largest Lithuanian chemical companies are AB Orlen Lietuva, AB Lifosa , AB Achema, UAB NEO GROUP, UAB Orion Global PET, AB Akmenės Cementas, UAB KB Components and others. According to the forecasts of the Lithuanian Public Employment Service, the biggest challenge in human resources management is the shortage of specialists and skilled workers. In the specialist group, the demand for engineering specialists (technology and production) is expected to grow.

The European Union's aspiration to guide industrial companies and organizations on the path of green transformation and digitalization is emphasized in the priorities of the European Commission. Therefore KTU in accordance with such changes are updating both first and second cycle study programmes in the field of Chemical Engineering integrating the challenges and priorities of social responsibility, innovation and digitalisation. From 2025 onwards, the second cycle study programme Chemical Engineering will launch a flexible learning pathway, which will better develop soft competences through challenge - based learning methods and freely chosen micro - modules.

Considering the key trends and demands of society and the job market, the core competencies expected of CTF graduates have been defined and incorporated into the Chemical Engineering study

programmes. These include Advanced Knowledge in the Field, Strategic and Systematic Thinking, Critical and Analytical Thinking, and Leadership for Positive Impact.

During the meeting with employers, social partners, and alumni, several questions were asked, such as: whether students who graduate and enter the labor market have analytical thinking skills, the ability to work independently, and the ability to learn on their own, and whether they have sufficient knowledge. Employers assured that the candidates who come are good enough and prepared for the labor market. KTU cooperates with employers, who ask KTU specialists how certain problems in industry can be solved. From the university, industry companies receive invitations to participate in process models and lessons. The alumni confirmed that it was easy to find a job after completing their studies.

However, several suggestions were made when employers were asked whether university-trained specialists meet labor - market needs and what improvements are necessary. They suggested adding practical training during master's studies, increasing focus on emerging technologies, and offering refresher courses on specific technical models. They also emphasized strengthening fundamentals in renewable energy, energy conversion, and sustainability. Alumni also mentioned that subjects such as physical chemistry, process modeling, and kinetics could be expanded. Students mentioned the need to expand the renewable energy course, update models, and teach how to change them as needed, renew some courses, as some subjects are repeated in bachelor's and master's programs.

The administration was also asked whether lectures on green energy are being held. It was mentioned that they are, but after all the meetings, it is clear that there is a need for a broader course related to renewable energy technologies.

Ten Bachelor's and ten Master's theses were submitted for evaluation. Each thesis includes engineering sections comprising simulations and calculations aimed at developing or improving specific technologies. Overall, the theses appear to be of a high standard. However, there were no theses related to hydrogen or solar cells. Topics related to renewable energy do not seem to have been widely developed; therefore, it is recommended that final projects related to renewable energy be developed more widely.

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

The goals of the Chemical Engineering study programmes align with KTU's mission to be an active and forward - looking university that contributes to a balanced society, develops and shares interdisciplinary knowledge and innovative technologies, and collaborates with research and industry partners to achieve ambitious goals. Both bachelor's and master's programmes support one of the university's main research and development priorities - Industry Transformation - and help KTU move toward becoming a leading European university in knowledge and technology creation.

The bachelor's programme in Chemical Technology and Engineering aims to develop skills in analysing and designing chemical products and processes that are safe, efficient, and sustainable, using knowledge from natural sciences, mathematics, engineering, business, and social sciences applied to various chemical technologies.

The master's programme in Chemical Engineering focuses on research - based learning and advanced design skills, enabling students to use experiments, modelling, and computer tools to

solve practical engineering challenges, develop new technologies, and strengthen innovation in the chemical industry.

Overall, the objectives and outcomes of these programmes support KTU's mission by preparing creative, analytical, and open - minded professionals who can make informed decisions, generate and share knowledge, and contribute to innovation both nationally and internationally. They emphasize responsible leadership, sustainable thinking, and impactful innovation.

In line with KTU's strategic focus on "Integration of Studies and Research, Cooperation with Industry and Business," the Chemical Engineering study programmes are developed and delivered with strong participation from industry experts. Business partners actively contribute to shaping the content and outcomes of the programmes to ensure their alignment with current market needs. Across both bachelor's and master's levels, students have multiple opportunities to apply their theoretical knowledge in practice - through laboratory projects, mandatory internships in chemical industry companies, problem - and challenge - based learning modules, and participation in research teams. These experiences allow students to tackle real - world industrial issues while enhancing their leadership, innovation, and change management skills, providing them with a strong competitive edge in the job market.

The objectives of KTU's Chemical Engineering programmes are closely connected to the strategic priorities of the CTF Faculty. CTF's mission is *"to be and remain Lithuania's leading institution for educating highly qualified chemistry specialists and conducting cutting-edge, impactful research in chemistry, chemical engineering, food technology, biotechnology, and environmental engineering."*

The outcomes of the Chemical Engineering programmes reflect this mission by supporting the faculty's goal to advance modern technologies and foster innovations that meet the needs of regional businesses and industries. This connection is strengthened through students' active participation in research projects focused on real industrial challenges and the development of practical, innovative solutions.

During the meeting with employers and social partners, it was discussed whether graduates of chemical engineering at KTU are needed in the labor market. It was confirmed that there is a shortage of employees with engineering skills, therefore the study program meets the needs of the labor market.

When asked about the administration or surveys conducted among graduates, it was confirmed that surveys are conducted and that the majority of graduates find employment and that the specialty is in demand in the labor market. The majority of those who find employment are satisfied with their work. Students also have the opportunity to do internships in industry and private companies, and they find internships very easily, as the companies themselves offer them, and some students stay on to work in those companies.

ANALYSIS AND CONCLUSION (regarding 1.1.)

Having reviewed the provided documents, it can be concluded that the programme's objectives and outcomes align with societal and labour market needs. The EU aims to digitise industry and introduce innovative technologies to reduce environmental pollution and develop sustainable technologies. The CTF offers programmes that prepare engineers for various roles in different areas of the chemical industry.

Although the documents emphasized the EU's strategic goals, including energy, the program description does not include a course related to renewable energy technologies. Therefore, it would be advisable to expand this course, as well as the number of final theses on this topic, in order to meet the needs of the labor market.

Bachelor's students easily find internships, and some of them stay on at those companies, so it can be concluded that the program meets the needs of the labor market. Some students continue their studies.

Master's degree graduates easily find jobs, but during meetings with employers, social partners, alumni, and students, it was suggested that some programs could be updated and revised.

In summary, the first cycle program in chemical technology and engineering and the second cycle program in chemical engineering meet social and labor market needs. However, it is suggested to expand the number of final thesis in the field of renewable energy.

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
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FACTUAL SITUATION

1.2.1. Programmes comply with legal requirements

According to the Descriptor of the General Requirements for the Implementation of Studies (30 December 2016, No. V-1168; 7 July 2023, No. V-953), the legal requirements can be considered to have been met.

The legal requirements establish the basic principles for the organisation of cycle studies, which are necessary to create an appropriate learning environment and to ensure the quality of studies. The general requirements are prepared in accordance with the Law on Higher Education and Research of Lithuania, the Lithuanian Qualifications Framework (Government Resolution No. 535, 4 May 2010), and the main European quality assurance documents, including the ESG, the European Approach for Joint Programmes, and the ECTS User's Guide.

The 1st-cycle programme (*Chemical Technology and Engineering*) as well as the 2nd-cycle study programme (*Chemical Engineering*) meet the requirements of the Lithuanian Qualifications Framework, and of the professional standards, approved by the Minister of Education, Science and Sport.

The Studies evaluated belong to the study fields of Engineering Sciences. They provide students with the knowledge and skills to a high level, in line with the learning outcomes of their chosen study field and prepare them for their future academic and professional careers.

The descriptors of the study cycles, describing the learning outcomes inherent to each study cycle are well defined according to the Order No. V-1012 of 16 November, 2016, of the Minister of Education and Science of the Republic of Lithuania. The descriptors define the different study cycles, interconnect qualification degrees in the background of the levels of the Lithuanian qualifications framework and the European qualifications frameworks. By that it informs future students, stakeholders and employers as well as people responsible for the implement and assess study programmes about requirements necessary for degree attainment. Concerning the two study programs the knowledge and its application required in study and professional activity fields are described in the papers provided to the evaluation panel.

The awarding of academic credits given in 1st-cycle and the 2nd cycle programme ensure that students can achieve the expected learning outcomes within a reasonable period of time. The structure and volume of 1st cycle (240 credits) and 2nd cycle (120 credits) comply with the mentioned Lithuanian regulations, including the General Requirements for Studies and the Descriptor of the *Study Field of Engineering*. The calculated study-time of the 1st cycle study programme is four years, which counts for a workload of 6400 hours, accordingly 240 ECTS. The 2nd cycle study programme is scheduled for 2 years with 120 ECTS in total. Both cycles ensure alignment with field-specific requirements, covering study outcomes, teaching, evaluation, and implementation standards.

For the 1st cycle programme to reach the total number of ECTS the professional internship counts for 15 ECTS just like the Bachelor's Degree final project. The master's final thesis of the 2nd cycle programme takes 30 ECTS.

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

The goals of the *Chemical Technology and Engineering* 1st cycle programme as well of the *Chemical Engineering* 2nd cycle programme are in accordance with necessary learning outcomes. An exception is the module P370B101 Biopolymers of *Chemical Technology and Engineering* 1st cycle programme which deals less with *biopolymers* and focuses more with *polymers*.

The learning outcomes, study methods, assessment methods and the relation to the study programme learning outcomes are clearly outlined and meet the EU-Bologna-requirements.

The documents made available to the panel presented module matrices which give a clear guidance through the aims, learning outcomes, teaching, and assessment methods of the study programmes. The didactic concept of the degree programs is clearly tailored to the specifics of the study programs and the requirements of students, some of whom are working alongside their studies, which was discussed in the meeting of the panel with the students. The study modules combine traditional classroom teaching with innovative new teaching and learning methods, hybrid courses, and e-courses. The corresponding forms of assessment are tailored to the respective teaching methods.

1.2.3. Curriculum ensures consistent development of student competences

The subject matrices provided for both degree programs offer an easy-to-understand overview of the options for selecting modules.

The matrices for chemical technology and engineering provide for 12 ECTS for general subjects in higher education - allowing to deepen language skills and knowledge in philosophy and sustainable development. 48 ECTS for core subjects in engineering, 42 ECTS for compulsory subjects in mathematics and physics, and 6 ECTS for subjects in the social sciences. 57 ECTS are reserved for so-called core subjects that are essential for the degree program, 39 ECTS for major subjects, 15 ECTS for internships, and 15 ECTS for the final thesis. The matrices clearly define when (in which semester) courses are offered, how many contact hours are allocated, and which lecturer is responsible for coordination. Modules are distributed very systematically to prevent overlap of courses.

The matrices for the chemical engineering program in the second cycle are no less clear. 72 ECTS are core and compulsory subjects, 18 ECTS are competence-related electives, and 30 ECTS are reserved for the final thesis. There are plenty of opportunities for specialization by choosing different electives to deepen understanding, knowledge, and skills. Here, too, the matrices clearly define when (in which semester), how many contact hours, and which lecturer is responsible for coordination.

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

Both Study Programs (*Chemical Technology and Engineering* and *Chemical Engineering*) in the study field of Chemical Engineering are consistent with the general description of the field and both meet the official requirements set by the Lithuanian Ministry and the EU.

The objectives of the study programmes, as presented in the SER and its Annex, are aligned with the intended learning outcomes, the objectives of individual modules and the selected teaching and assessment methods. The module matrices confirm that the modules comprehensively cover the learning outcomes of the study program, which ensures that the students can meet all necessary requirements. In order to cater to the individual interests of students and give them the opportunity to develop their strengths, elective courses are offered in both degree programs (1st cycle 57 ECTS, 2nd cycle 18 ECTS). For the 1st cycle programme the so called *bridge courses* can be considered very important, as they enable a smooth transition from school to university studies in particular to the two study programs mentioned above. This was also confirmed by the students in the discussion with the panel. The opportunity to deepen one's knowledge of "philosophy and sustainable development" as well as "foreign languages" (level C1) is remarkable, as it broadens the horizon of possibilities for future employment. In the 1st cycle programme students can choose between two specializations within the program: "Organic Materials Technology" which, as mentioned above, does not really include biopolymers and "Inorganic Materials Technology." Furthermore there are flexible learning pathways like pedagogy for teaching qualification (60 ECTS), innovation pathways (24 ECTS) including e.g. entrepreneurship, and challenge based learning pathways with 18 ECTS. The students of 2nd cycle programme can personalise their studies by choosing the path to become a field or an interdisciplinary expert. Students can choose their track through a set of relevant modules in 1–3 semesters. The students prepare individual projects in the Master's degree final project. Project topics are offered which are quite often the real-life challenges. The necessary internship can be done during time off or in the summer.

Additionally students have the opportunity to get involved within the ECIU university through modules from 13 university partners to work with an international and interdisciplinary team of students and mentors on issues related to SDGs raised by companies, organizations, and the country.

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

The final theses/research projects clearly reflect the focus on the fields of chemical technology and chemical engineering. Most final theses are good examples of applied research and, in this sense, aim at practical improvements, innovations, or optimizations of chemical processes in industry. Unfortunately, research projects focused on basic research, which often provide the necessary basis for later application-oriented projects, are rare. This could be particularly true for master's theses, but application-oriented research projects expand employment opportunities for the graduates. The final theses - Bachelor as well as Master - are clearly assigned to supervisors and are formally assessed and graded by committees comprising both internal and external experts who can and should provide an unbiased assessment. The 20 final theses (10 Bachelor -and 10 Master theses) submitted, indicate that the work is of high quality. Since most of the work is carried out within the framework of industrial cooperation, it must also be ensured that the work is blocked for a defined period of time, i.e., not accessible to the public. This is necessary and guaranteed by KTU. The quality of the bachelor's theses, which are graded with 15 ECTS credits and are usually part of projects, was rated as very good by industry partners. The master's theses, which are graded with 30 ECTS credits and written in English, also demonstrate a high level of research quality and are mostly independent project work.

ANALYSIS AND CONCLUSION (regarding 1.2.)

Both study programmes - the 1st cycle Bachelor and the 2nd cycle Master programme - meet Lithuanian legal requirements and EU regulations. This already includes the possibility of motivating international students to enroll in these attractive study programs. Unfortunately, the disadvantage is that not all modules or courses are offered in English – however, for ERASMUS+ incoming students there are ways to get around this by choosing a suitable learning agreement.

In general students have access to elective courses - as required for European study programmes - in both cycles creating possibilities to personalize the curriculum for individual specialisation.

All study programme fields are very well described, contain required learning outcomes of the studies and the specific modules, define the responsible module teachers, contain a time table to avoid overlap of courses, define the prerequisites and general requirement of the study programmes and the inherent modules.

The objectives of both study programs are aligned with their learning outcomes and the objectives of the individual modules, as well as the selection of teaching and assessment methods.

The meeting of the evaluation panel with the industrial representatives and social partners revealed the insight that there is a significant demand for chemical engineers of the industry in Lithuania. As in other European countries, the number of graduates is not high enough to meet industry demand. However, the structure of the two study programs presented is attractive to new students, and KTU's efforts to attract new students are visible and should lead to greater interest among young people.

The quality of the bachelor's and master's theses was rated as very good across the board by industry partners, which speaks for the quality of the graduates' education. The quality and level of bachelor's and master's theses meet international standards.

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. It is worth highlighting the installation of the EDU_Lab Centre, the Career and Service Centre, the Artificial Intelligence Centre and the Lifelong Learning Centre. All four facilities demonstrate the university's innovative, forward-looking approach. A notable facility is furthermore the “publishing house”.
2. The working conditions, including the working environment that students encounter, are consistently good up to very good.

RECOMMENDATIONS

To address shortcomings

1. No shortcomings

For further improvement

1. The 1st-cycle study programme should include a more thoughtful setup for the biopolymer module which is at the moment lacking information about all important biopolymers (cellulose, lignin, hemicelluloses, proteins) - it should be of importance as several research effort/projects of KTU are already working in this direction.
2. More courses or/and modules could be offered in English to promote internationalisation.

AREA 2: LINKS BETWEEN SCIENTIFIC (OR ARTISTIC) RESEARCH AND HIGHER 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
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FACTUAL SITUATION

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

The Faculty of Chemical Technology at Kaunas University of Technology (KTU) comprises 13 research groups, nine of which are directly involved in the delivery of study programmes in the field of Chemical Engineering. The research groups of note are Technological Research of Alternative Cementitious Materials and Geopolymer Composites, Multicomponent Heterogeneous Systems and their Application Technologies, Electrochemistry and Chalcogen Chemistry, Polymer Research and Chemistry of Materials. These are all aligned with current priorities in science and engineering meeting national and international research needs.

The quality and impact of KTU's research are systematically evaluated through national and international peer reviews. The Lithuanian Science Council conducts annual quantitative assessments and comparative expert evaluations every five years in accordance with the Procedure for Allocating State Budget Funds for Research, Experimental Development and Artistic Activities to Higher Education and Research Institutions, approved by the Resolution of the Government of the Republic of Lithuania (No. 149 of 1 March 2017).

As highlighted in the SER, in the 2023 peer review report on R&D activities international reviewers noted that the research output (for quality, economic and social impact, and viability) is of a very high standard and internationally recognised. This is witnessed by papers in very high tier journals such as Science, Nature Materials, Advanced Energy Materials, Nano Energy and ACS Energy. The faculty has an international reputation and recognition in the fields of perovskite solar cell materials, food science and organic materials research. A mark of 4 was merited but since then there has been improvement in both output and research infrastructure. There was also increased research funding for the period of assessment as clearly shown in the SER.

It is of exceptionally high quality with a number of researchers with excellent scientific impacts metrics including high quality papers, high citation rates, high quality conference and seminar presentations. This is reflected in the web-of-science and presented in the SER which demonstrate the number of publications has been increasing: "135 in 2021, 151 in 2022, 134 in 2023 and 68 in the first half of 2024". It should also be noted from the information provided that more than 50% are published in scientific publications with co-authors from foreign institutions which is another mark of excellence. The excellence of the research output is witnessed by a strategy on focussing publications on high reputation publishing houses such as Nature Materials, Elsevier, Wiley, American Chemical Society, Royal Society of Chemistry, Advanced Energy Materials, Nano Energy

as detailed in of the SER (Appendix 4). It is noteworthy that in 2021, 2022, 2023, and 2024, 5, 8, 13, and 3 patents and patent applications (European, U.S., and Japanese), respectively, were submitted (SER, p. 34). This demonstrates sustained technological progress and strong commercialization potential.

The faculty participates in world-class research projects funded by national and international (mostly EU) research grants. SER (Appendix 8) contains information and a list of projects carried out by the faculty during the evaluation period. They document the research activities of the teaching staff in the two study programs – a total of 43 international and 145 national research projects.

The research is accompanied by numerous research grant funding including various EU Horizons and other high level research grants entailing international cooperation. Examples of the level and quality of the Horizon programme grants include "Heavy metal free emitters for new-generation light (MEGA)"; "Strong-coupling-enhanced nanoparticle array organic light emitting diode (SCOLED)"; "Disaggregation of conventional vegetable press cakes by novel techniques to receive new products and to increase the yield (DISCOVERY)". Research Group Projects "Two-stage synthesis, structure and properties of low calcium cement (LIMECEM)"; "Organic hole transporting materials with low ionization potentials for perovskite solar cells"; "Long lifetime third generation organic light emitting diodes for physiologically friendly lighting", "Click dual-cured plant-derived polymers for laser 3D meso-scale structuring (CDCmeso3D)"; The award of over 4 million Euro of research grants in 2024 is evidence of the vibrant nature of the chemical engineering research at KTU.

The researchers collaborate with a number of international research centres, including those in Belgium, China, Denmark, Estonia, Finland, France, Germany, India, India, Japan, Japan, Finland, France, Latvia, Poland, Norway, Sweden, Switzerland, Switzerland, Ukraine, the United Kingdom of Great Britain and the USA amongst others. The research with national industry commercial and entities also reflects the quality of the institution. Researchers in the field of Chemical Engineering work with leading national and international companies including AB Orlen, AB Roquette Amilina, UAB Divaks, UAB DP acetate, AB Dolomitas, AB Achema, UAB SSF, UAB Rim Logistika, UAB Valentis, UAB Origmed, UAB Virmalda, UAB Asneka, UAB Riktinga, UAB Reola, AB Higėja, etc.). Students at both 1st and 2nd cycle actively participate in the KTU dynamic research programme. 34 students in the study field of Chemical Engineering took part in research activities, some of them in several activities (as seen in Appendix 10).

Students regularly participate in international scientific conferences organised both by Lithuanian higher education institutions and international organisations and scientific communities (e.g., Central and Eastern European Conference on Physical Chemistry & Materials Science, Baltic Polymer Symposium, etc. organised by the KTU CTF together with international partners). There has been extensive effort by the KTU staff to engage in schemes by the Research Council of Lithuania to sponsor summer and internship work in the research groups. It is important to note that in the reporting period 2021–2024, students in the field of Chemical Engineering published 30 articles in indexed publications according to the Web of Science database as well as 4 conference papers and made 165 research presentations at various conferences (as listed in the SER report, Appendix 10).

Students at both 1st and 2nd cycle actively participate in the KTU dynamic research programme. 34 students in the study field of Chemical Engineering took part in research activities, some of them in several activities (as seen in Appendix 10). Students regularly participate in international scientific conferences organised both by Lithuanian higher education institutions and international organisations and scientific communities (e.g., Central and Eastern European Conference on Physical Chemistry & Materials Science, Baltic Polymer Symposium, etc. organised by the KTU CTF together with international partners). There has been extensive effort by the KTU staff to engage in schemes by the Research Council of Lithuania to sponsor summer and internship work in the research groups. It is important to note that in the reporting period 2021–2024, students in the field of Chemical Engineering published 30 articles in indexed publications according to the Web of Science database as well as 4 conference papers and made 165 research presentations at various conferences (as listed in the SER report, Appendix 10).

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

The link between Chemical Engineering study content and scientific and technological achievements is ensured through the continuous updating of learning outcomes and study modules. Module topics, teaching methods, and literature are regularly reviewed to reflect current scientific and practical developments, with students accessing relevant research through KTU-subscribed databases such as American Chemical Society, Web of Science Core Collection, Science Direct Journals, and references are provided in individual module descriptions and/or in the Moodle environment, which are referenced in module descriptions.

The integration of current scientific findings and technological innovations into the study programs is ensured by the high level of expertise of the academic staff, which is continuously expanded through international scientific and professional activities. The program's teaching staff and students participated in the international conference "Chemistry and Chemical Engineering," which took place at KTU CTF.

The latest scientific knowledge and technological innovations are integrated into the study programmes through the high scientific competence of academic staff, which is continuously strengthened by international conferences, internships, research publications, and participation in editorial boards of international scientific journals. Such as: ICAMS: the International Conference on Advanced Materials and Systems, MACRO 2022 – the World Polymer Congress, Functional Inorganic Materials, ICONSAD: International Congress on Scientific Advances, etc.

The integration of the latest scientific knowledge and research results in Chemical Engineering studies is mainly ensured through the 2nd-cycle programme by involving students in ongoing research projects and using project-based data for master's theses, enabling more advanced research experience. At the same time, 1st-cycle students are introduced to current scientific and technological achievements through dedicated modules, guest lectures by industry and research representatives, and participation in scientific conferences, with sustainability and innovation reflected in both study content and methods.

The students are exposed to a modern and evolving curriculum based on current research imperatives. The 1st-cycle and 2nd-cycle students have a choice of modules which allows them to develop research interests. The current programmes are influenced by high quality research in the following areas (a non-exclusive list):

Advanced Environmental Technologies: Focuses on methods for purifying polluted air, water, and soil, waste recycling, and resource recovery using advanced technologies (nano, bio, etc.).

- **Chemistry of Materials:** Researching the synthesis of organic polymeric and low-molar-mass electroactive materials for optoelectronics (e.g., organic light-emitting diodes and perovskite solar cells), and the development of sustainable composites from natural resources.
- **Bioprocess Analysis and Development:** Researching novel biocatalysts, metabolic engineering, and the biotransformation of waste and C1 gases into value-added products.
- **Alternative Binders and Geopolymer Composites:** Technological research into alternative binders to ordinary Portland cement and the use of various raw materials in silicate systems to produce low-CO₂ functional inorganic products.
- **Multicomponent Heterogeneous Systems:** Developing and applying catalysts, adsorbents, and liquid chemisorbents in various technologies, including special compound fertilizers.
- **Functional Food Ingredients:** Research into the synthesis of bioactive compounds extracted from renewable raw materials and the development of functional food ingredients.

As well as these areas students can participate in modules from the Bachelor's degree in Renewable Energy Engineering (taught in English) which focuses on the design, development, and application of solar, wind, and other eco-friendly energy sources. They can also enrol in a Master's degree in Energy Technologies and Economics, which provides expert knowledge in energy systems and technology management.

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

Students in the field of Chemical Engineering are provided with favourable conditions to engage in scientific and applied research through support from the University, The Faculty of Chemical Technology, programme management, and academic staff, with coordination by the KTU Student Affairs Department, provide opportunities for student involvement in the Students' Scientific Society. The faculty teachers of the degree programs are researchers who conduct the aforementioned high-quality research at the faculty. More than 70 teachers serve as academic mentors. Since 2021, the KTU Student Affairs Department, in cooperation with the Career Centre, has been launching calls for applications for research funding related to academic mentoring.

SER Appendix 10 documents clearly the engagement of students in research projects by listing the publication output. The diversity of publications shows also the broad research range the students are involved in. The publications (between 2021 and 2024) are of high standard: 30 publications in peer reviewed journals, 4 in peer-reviewed conference proceedings.

An important aspect is the participation of students in international scientific conferences. As mentioned in SER p.41 KTU hosts e.g. *Chemistry and Chemical Technology* and international organisations and scientific communities (e.g., *Central and Eastern European Conference on Physical Chemistry & Materials Science, Baltic Polymer Symposium*) - a chance for students to participate.

Research activities for 2nd-cycle students require advanced research competence, often involving co-authorship of Web of Science–indexed publications. Funding measures by the Research Council of Lithuania such as “Funding for students research projects (summer scholarships)” and “Funding for students research projects (semester scholarships)” are very effective for increasing the scientific output of students. During the reporting period of 2021–2024, 21 students from study field of Chemical Engineering participated in RCL funded internship projects. 43 were involved in international or national scientific projects, as well as in R&D activities

All undergraduate (32, in 2023-24) and postgraduate (23, same period) students of chemical engineering at KTU take part in laboratory or computer based (e.g. process based modelling and design) research projects. These are led by professors and/or an appropriate industry mentor. Many 1st and 2nd-cycle projects are based around industry placements. External research is well-monitored to ensure high quality. Many of these placements lead to employment. Social partners expressed strong support for the research carried out at KTU and the participation of student researchers within their companies.

All students carry out research-led study with literature reports a compulsory component of the course. Students spend time in advanced research laboratories as part of their training and are exposed to research groups within the faculty. Further, students can participate in research summer internships within the academic research groups. Students can also join research groups that collaborate with businesses and work on projects related to their coursework, such as in applied chemistry or environmental engineering.

The faculty and university offers KTU PhD programs in Chemical Engineering for individuals interested in pursuing fundamental and applied research in this field. These are available annually. The engagement of these PhDs (and a number of post-doctoral fellows) with the teaching programme is mutually beneficial to their development and the development of the undergraduate students.

ANALYSIS AND CONCLUSION (regarding 2.1.)

The links between scientific research and higher education are very well established. The objectives of the research program are being achieved exceptionally well and meet international standards. The research is of very high quality, as evidenced by external evaluations from organizations such as the QS World University Rankings by Subject, which ranks KTU among the top 10% worldwide. Research-led teaching includes student participation as an essential element of first- and second-cycle programs, and there are good opportunities for further doctoral studies. The first and second cycle programs are very research-oriented, and the modules reflect current research issues in chemical engineering.

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. Engagement with industry of excellent quality and tailored to national needs
2. Undergraduate and post-graduate courses are research led and sponsor student involvement and choice of specialisation
3. Courses reflect modern research topics as well as local industry needs
4. The university hosts an excellent web-site detailing research in the university and its impacts (papers etc.)
5. Participation in initiatives such as Erasmus enhance the students exposure to world class research

RECOMMENDATIONS

To address shortcomings

1. No shortcomings

For further improvement

1. The intellectual property arrangements for students carrying out external research programmes as part of 1'st and 2'nd-cycle courses appeared ad-hoc and more formal arrangements and expectations should be considered.

AREA 3: STUDENT ADMISSION AND SUPPORT

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

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

The criteria of selection and admission in KTU's Chemical Engineering program are transparent and easily comprehensible. The criteria of admission to the first cycle follow the national coordinated LAMA BPO process. Comprehensive details about deadlines and criteria posted on the LAMA BPO website, KTU further provides Senate-approved criteria related to admission to its website every year. Only applicants possessing at least average exam performance of basic learning level requirements and subsequent competitive scores for that particular year have eligibility to be part of KTU. These requirements are provided in a clear and organized way. The competitive score is calculated with a clearly defined formula, which explicitly details about weighting values for each subject and supplements other values. The program has seen a healthy number of students – 69 1st cycle students over the review period, of which 24 were non state-funded. And 70 2nd cycle students over the review period, of which 7 were non state-funded. The report also notes that during each of the evaluation years, more than 20 international students attended full-time. The applicants also have high competitive scores, average being ~8. Requirements for admissions to the second cycle are also clearly defined. Applicants must provide a relevant bachelor's degree or complete required additional studies, meet minimum credit requirements for this study field, and have English proficiency at B2 level. The admission is organized via KTU website and the competitive score formula is available publicly. It can be concluded that overall, there is strong evidence that KTU has legally compliant, structured and publicly communicated admission processes. This ensures that students are selected through a transparent and appropriate structure.

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

The recognition of foreign qualifications, study periods abroad, and prior learning at KTU is addressed by very organized, formalized, and transparent processes, showing strong alignment to national regulations and best practices. The admission and recognition of foreign applicants follow the DreamApply process to ensure a standardized process among all applicants from abroad. The International Relations Department deals with academic recognition of foreigners' education, and all processes (including qualification recognition, identification of equivalent subjects, and the translation of grades into the Lithuanian system) have been published publicly on KTU's website to ensure transparency and ease of access to all prospective applicants. KTU strictly follows general ECTS principles to ensure recognition of credits according to learning results and workloads. In case of qualified mobility agreements (Erasmus+) following study results are transferred seamlessly to KTU without negotiations if these meet agreed content requirements as long as the student meets decided criteria. In case when studies are conducted out of qualified agreements, KTU sets firm limits (no more than 75% of first cycle study credits), ensuring flexibility and honesty in decisions. Optional courses can be transferred without limits; defending of masters' theses would require defense either in KTU as usual or joint defense to ensure honesty to mastering qualification results. Overall, KTU shows a comprehensive, well-documented, and student-oriented approach to recognising foreign qualifications, mobility periods, and prior learning.

ANALYSIS AND CONCLUSION (regarding 3.1.)

KTU has shown to have established robust, transparent, and well-regulated processes for student admissions and for the recognition of foreign qualifications, mobility periods, and prior learning. Admission criteria for both study cycle levels are clearly defined, publicly presented, and applied through centralised systems, ensuring fairness, consistency, and academic justification.

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

3.2.1. Opportunities for student academic mobility are ensured

The university engages effectively in Erasmus+, bilateral agreement exchange schemes, and Blended Intensive Programmes (BIP), offering multiple options to students to go abroad to study or do internships. Students who fulfill either Erasmus+ exchange criteria or any other exchange criteria can apply to join these exchanges via transparent competition processes arranged by the faculty committee. Finally, student mobility is also academically facilitated - prior to their trip abroad, students must conclude their study plan agreement with the Vice-Dean of faculty to ensure seamless recognition of credits for their academic success to be counted towards their degree. KTU provides administrative, academic, and informational services for mobility related to consultations, helping with Learning Agreement issues, as well as support from the International Relations Department. The culture of mobility is also promoted by strong international collaborations in research and a large number of international partners, which provide diversity to mobility options for KTU students in terms of relevance to Chemical Engineering. The outgoing student mobility for 2022-2024 involved exchanges to institutions such as Hanyang University (South Korea), National Taiwan University of Science and Technology, Lodz University of Technology, and Universidad Politécnica de Cartagena. The incoming mobility also exists, for example, for the first cycle of study in Chemical Technology and Engineering, there have been full-time international first-cycle students numbering 26 in 2021-2022, 21 in 2022-2023, and 27 in 2023-2024. In general, KTU provides for student mobility via well-established procedures, excellent administrative services, broad cooperation partners, and active student exchange.

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

KTU offers a full and organized framework of academic, financial, social, psychological, and personal support, which seems relevant, sufficient, and effective for the target students of the Chemical Engineering study field. In terms of academic matters, KTU provides strong monitoring of student performance via mid-semester roundtable talks, constant feedback, and Academic Information Systems enabling staff and programme committees to note areas of challenges and make changes to teaching or direct additional learning support. It can be seen from student involvement in research (33 publications and over 180 conference participations) that academic support is very strong. The university also provides decent social and psychological support through counselling, accessibility support for students with special needs, guidance from the Study Centre and opportunities to consult lecturers directly. Financial support is available through many means, such as scholarships, competitions, incentives and support from social partners. Over the review period, the 1st cycle students received a total of 118 scholarships and 2nd year students received a total of 47

scholarships. In general, KTU's comprehensive support framework covers academic, psychological, social, and financial issues.

3.2.3. Higher education information and student counselling are sufficient

KTU provides adequate and organized information about higher education and student counseling in such a way that students in the study field of Chemical Engineering have access to relevant information even prior to and after enrollment. Aims of the study program, its structure and learning outcomes, module description, admission requirements, and accreditation status can be accessed prior to enrollment by prospective students. After enrollment, introductory briefings and faculty-level communications introduce new students to study program details. Significantly, counselling offered in KTU is not only at the start of academic study but also extends to ongoing counselling processes via academic monitoring and student-teacher interaction. Administrative counselling services are offered in the Study Centre and faculty administration for academic planning and study agreement as well as personal issues. In this context, Early Warning Systems play their part to identify and direct student mentoring to guide such students academically and psychologically. Taken together, KTU provides for a coherent, accessible, and responsive way of student counselling in higher education. The students are introduced to the programme in a proper way from the start and are also encouraged to have their counselling needs addressed from start to finish throughout their study time.

ANALYSIS AND CONCLUSION (regarding 3.2.)

In conclusion, KTU ensures a comprehensive and student oriented framework for academic mobility, student welfare, and informed participation in their education. The opportunities offered for academic mobility are diverse and transparent and come under strong global collaborations. In student services, KTU ensures comprehensive support in monitoring academic performance, financial aid to different extent depending on student circumstances and needs, as well as available and well-organized social/psychological and personal services. All of these fields show that KTU provides exceptional conditions for both national and international students.

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. KTU shows great initiative with student-to-student counselling, where students can get financial compensation when tutoring their colleagues.
2. Students show active participation in research projects as well as summer research projects.
3. Strong infrastructure for student support in all aspects during their study time.

RECOMMENDATIONS

To address shortcomings

1. No shortcomings

For further improvement

1. Strengthen KTU's positioning as a competitive destination for inbound mobility from neighbouring countries and the EU.

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

4.1.	Students are prepared for independent professional activity
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FACTUAL SITUATION

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

The first cycle study programme Chemical Technology and Engineering and the second cycle study programme Chemical Engineering provide subject in the extent up to 15 ECTS, where most relevant subjects, e.g. Heat and Mass Transfer, Process Optimisation, Chemical Thermodynamics, Textile Chemistry and Technology, Industrial Electrochemistry, are appearing in correct curriculum order/structure. The use of specialised engineering software is commendable, for example Aspen HYSYS and Aspen Plus simulation. Aspen, AutoCad, MatLab SOLIDWORKS are used. This is indeed very useful. The similarity check system "Turnitin" integrated into the "Moodle" environment is used to determine the similarities between the written works and other sources being used, which promotes the originality of drafting, as opposed to resort to extensive paraphrasing. The University uses a cumulative assessment system, whereby the final grade for a study module consists of the grades of the midterm report and the final report, multiplied by weighting factors, whereas the final assessment of the module accounts for at least 30 per cent of the final mark for the module – this is positive, as it promoted continuous student engagement rather than having long learning breaks. Individual student work is well organised. Information is presented to students during the first lecture and published both in the "Moodle" system, by email communication with teachers, and during classes. Students also receive this information by logging into KTU AIS. This makes it accessible. The work of students is focused on the development of different skills: to work individually and in a team to carry out project activities (e.g. Product Development Project, Technologies Entrepreneurship). This promotes multifaceted student skills. The Professional Internship modules (15 ECTS) are an important part of the first cycle of studies, which have been commended by both students and alumni, as it helps to provide some practical experience to students. The most important part of the two-year second cycle study programmes is the modules Research Project 1 and Research Project 2 or Research Project and Practice, during which students, in consultation with their final project supervisor, provide the focus considering their work finalisation quite early on, which is commendable.

Further career opportunities are in place - currently, 12 graduates of the KTU study programme Chemical Engineering are pursuing doctoral studies in Chemical Engineering. They can continue their studies in their field of interest by choosing to study open courses UP4SKILL from KTU second

cycle programmes. Alumni describe career opportunities, affirming that knowledge attained seems to be sufficient. The state also provides some financial support, which also helps substantially. Students possess an extensive attained chemical engineering knowledge, which is fit to the needs of industry, as evidenced by consolidated alumni testimonials, which confirmed SER outline. Some minor shortcomings were expressed from the viewpoint of later stage BSc/MSc students, which benchmarked other engineering programmes, with which they familiarised through Erasmus / elsewhere. Graduate future employers were vastly positive, pointing out a rising digitalisation need.

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

KTU shows a strong and visible effort to provide access to higher education for socially vulnerable persons and students with individual needs. The University implements its Equal Opportunities and Diversity Policy and Violence Prevention Policy, creating an environment that respects individual dignity and values diversity. They provide study access assistance via study access information and support services delivered by the Study Centre, faculty administration, and online platforms such as the Academic Information System and Moodle. After enrollment, KTU ensures personalized learning environment conditions if needed. The ability to customize learning paths, workloads, and learning environment if needed to accommodate students suffering from health issues, disabilities, or other special requirements. The presence of scholarships and commendations, in addition to cooperation with social partners, can ensure easier access to study processes by creating belongingness. In general, KTU creates a supportive environment where socially vulnerable students as well as students who have individual needs have access to services as consultations and individual learning paths as well as inclusion in academic life. The early detection systems implemented by KTU ensure these students fully and successfully participate in post-secondary education. There were no students with special needs in the Chemistry degree programmes during the evaluation period.

ANALYSIS AND CONCLUSION (regarding 4.1.)

In general, it is concluded that aims are met. The comparison with the most advanced global engineering programmes, as well as considering advanced digitalisation tools, arising over time shows that KTU is on a good track when it comes to hands on digitalisation use (modelling, software, tools). Rethinking some curriculum repetition mentioned by the students especially when it comes to plastics, was noted with regard to the second cycle, whereas this was not mentioned for the first one that notably. All in all, management/teachers note that these are diligently considered, as well as are mentioned in SER. One could note a high level integration of research as well, which is commendable.

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

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

In September, the Department of Academic Affairs prepares an annual report of the monitoring of the students' learning outcomes (according to the faculties and the study cycles) and presents it to

the University rectorate, whereas ultimately, the responsible persons and lecturers in the field are also reflecting on it in the context of each module. This reflects the familiarisation by the feedback at the highest, as well as hands on teaching level, which provides a very diligent manner of monitoring. Individually, the Chemical Engineering Degree Programme Committee keeps track of students' achievements in the Academic Information System – frequency is sufficient.

Some required attendance has been introduced, which is commendable, as it renders teaching more effective, as it's noted. The Regulations on the Assessment of Study Modules regulate the procedure for the students' attendance in classes.

Feedback is provided to students orally or in writing (Moodle), which is a centralised communication environment, also evidenced elsewhere (grading etc.).

The progress of the 1st cycle students preparing for the Bachelor's degree final project is constantly monitored by the supervisor. The progress of second cycle students who are completing the modules Research Project 1, Research Project 2 or Research Project and Practice and who are working on their Master's degree final project during the last semester is constantly monitored by the supervisor as well. Students confirm that this is well managed, which is validated by alumni/industry as well.

The monitoring of ongoing learning progress is systematic with enrolled student performance tracked regularly, results informing instructional staff adjustments, and these being met. Although the present student-teacher ratio is slightly below targeted, the university aims to increase quality enrolment capacity to strengthen individualised alumni feedback. Student enrolment numbers remain relatively stable, allowing teachers to follow learners' knowledge progress consistently over time. Feedback is provided to students to support their self-assessment, guide the purposeful gradual planning of their learning goals, and complaints are taken seriously. Minor student criticism is addressing sometimes redundant course content especially related to the processing of plastics. According to feedback from the panel discussion, students would like to see further improvements in this area. Career path data show that around a half of students (BSc) move into industry, while the remainder continue in further higher education, information that helps to shape tailored career guidance, progress planning and industry inclusion.

4.2.2. Graduate employability and career are monitored

In the SER it is presented that KTU graduates are among the most employable in the world in accordance with the QS Global Employability Rankings. The Chemical Engineering Programme Committee and faculty continuously monitor graduates' employment and career paths through ongoing cooperation with students, alumni, companies, and social partners, gathering feedback on acquired competences and their workplace applicability via regular formal and informal meetings. Each year from October to January, graduates of the current and previous year are surveyed to assess their career paths, employment timing and challenges, relevance of their studies to their profession, and the usefulness of their acquired knowledge and skills, with their feedback used to prepare recommendations for faculties and administrative departments and improve University processes. During meetings with the administration, employers, and alumni, it was confirmed that surveys are conducted on employed graduates and their career mobility.

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

The University's administration assures compliance with the Statute of the University and KTU Academic regulations. The Board of Academic Ethics assures compliance with the Code of Academic Ethics. There is a very direct option for students to file a complaint through a report (form). On the other hand, students undertake to follow the academic discipline, the procedure stipulated by the Code of Academic Ethics. KTU is adhering to the Policy on the Ethical Use of Generative Artificial Intelligence. This keeps it on track with current AI content challenges, which are arising. The

University applies the Guidelines for the Organisation and Performance of the Study Modules Assessment, which is yet another way to accommodate integrity continuously. There is also the Commission for Settlement of Academic Violations, should there be any complaint noted, which is commendable. The University has prepared the Guidelines for the Plagiarism Prevention in the Written Works, which can be perceived as a very welcome guideline in coherence with the aforementioned one on artificial intelligence use. All mention committees have consequently a very clear code of conduct, which is described detail-wise.

Guidelines are in place – discussions with alumni and students have yielded generally positive feedback. KTU has internationally-recognised policies in place, hence not seeing possible issues that could or should be addressed, respectively – in overall, this is well managed. KTU has specific committees and bodies, such as the Academic Ethics and Equality Committee and the Violence Prevention Committee, which monitor the implementation of the guidelines. The university conducts regular training in these areas. In this way, the university aims to ensure academic integrity, tolerance, and non-discrimination.

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

There were no appeals or complaints in the study programmes of the field of Chemical Engineering during the evaluation period. Considering the procedures in place, this is commendable, as it is clear that this is not due to the absence of pathways, but presumably due to there not being any (notable). The University applies the Guidelines for the Submission and Processing of the Students' Appeals and Complaints. The procedure for an appeal is described quite in detail, while students are made aware of the latter, so that this should allow them to have a very straightforward instrument available. A lot of attention is paid to appeals and complaints in CTF. There were specific course content repetition concerns raised by students, but considering the absence of an appeal, such a pathway has apparently not been used, which would imply that either it was not grave or not that frequent. The complaint procedures are very effective, as graduates confirm. Constructive feedback is provided regularly and carefully considered, so that the results of complaints are tangible. The KTU has established transparent procedures for the submission and processing of complaints and appeals.

ANALYSIS AND CONCLUSION (regarding 4.2.)

Learning progress within the program is monitored systematically, with students' overall performance being recorded regularly and the results being used to adapt courses, while at the same time giving graduates a voice. Present student–teacher ratio is slightly below desired, but enrolment, staffing and quality programme strategies aim to strengthen individualised student feedback. Stable student numbers allow consistent feedback tracking. Minor student criticism is addressing sometimes redundant course content related to the processing of plastics.

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. Extensively positive provided alumni feedback indicates that knowledge acquired is appropriate for further career use. Faculty are having constant feedback loops with alumni or industry, while students being in a realistic industrial environment gain appropriate experience.

RECOMMENDATIONS

To address shortcomings

1. No shortcomings.

For further improvement

1. Considering feedback, it is recommended to try to specifically track (and adjust) the feedback of students considering courses specifically; particularly, when it comes to either repetition or digitalisation.

AREA 5: TEACHING STAFF

5.1.	Teaching staff is adequate to achieve learning outcomes
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FACTUAL SITUATION

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

59 lecturers are involved in the implementation of the first and second cycle study programmes in the field of Chemical Engineering at the Faculty of Chemical Technology. The ratio of the students to teachers is decreasing a bit over time from about 9 (CTF)/13 (teachers) (2021) to 7 (CTF)/12 (teachers) (2021).

The modules of the study programs in Chemical Engineering are coordinated and taught by 17 professors, 30 associate professors, and 17 assistant professors. The latter indicates an expected teacher distribution, having >10 young assistant professors being especially commendable for development.

Due to changes, one teacher (approximately 2%) has less than 5 years of academic experience, and 5 teachers (approximately 8%) have between 5 and 9 years of experience. This can be anticipated as the most prospective tenured young educators should be progressed based on merit. There is module continuity logic, which is quite streamlined. *E.g.*, Process Engineering modules (first cycle) contain 9–12 teachers working in a team depending on the semester: the most experienced teachers coordinate the modules (e.g., Process Engineering 1; Process Engineering 2).

Each program is visited by 4 to 8 guest lecturers per semester, representing individual companies, business associations, or government institutions, which is evidenced by the meeting with industry, whereas all relevant stakeholders (teachers, students and industry) point this out as very well in place.

The number, qualifications, and competence of the university's teaching staff are exceptionally strong and sufficient, both nationally and internationally, to achieve the intended learning outcomes. Most programme staff is Lithuanian with occasional inbound exchange, some have past industrial experience, and at least approximately half of all course teachers are qualified chemical engineers,

ensuring subject specific expertise. Contracts become permanent after a five year tenure with no strict enforced retirement age, supporting teaching staff stability, continuity and sustainability. Teaching, research and development staffs' responsibilities are balanced with a maximum of 50% direct classroom workload, while staff have flexibility to implement courses effectively. Overall, the present student–teacher ratio is adequate, low staff turnover contributes to consistent material delivery, alumni-evidenced high quality learning experiences and progress, and laboratories correspond to the challenge at hand.

ANALYSIS AND CONCLUSION (regarding 5.1.)

Erasmus+ is promoted for mobility/exchange. Teaching activities must contain at least 8 teaching hours per week (or over a shorter period). When discussing with teachers, it was confirmed that it is used often, as well as gaining in traction, when it comes to staff, as well as students, mentioned before.

The number of teaching or training visits by teachers of Chemical Engineering study programmes during the evaluated period increased significantly, as teachers went from 5 (2021) to 15 (2024), whereas the number of institutions increased from 5 to 12, but the former is much more relevant altogether.

Over the last 3 years almost 40 percent (22 lecturers) of the lecturers in the Chemical Engineering study programme have benefited from the Erasmus+ programme, and have been on 49 trips to teach in foreign higher education institutions. The overall mobility fraction is indeed quite commendable.

The opportunities for an active academic mobility of all teaching staff are available, though overall mobility remains limited with an average of one month abroad *per* five year period. There is no mandatory staff mobility requirement, *sabbaticals* are not common, and inbound teacher visits are currently less common, indicating a potential for improvement. Two active Erasmus+ agreements support the international diploma programmes with the average foreign stays of around two month periods. Mobility-based research projects are actively pursued, providing additional international development engagement opportunities. Efforts to increase slightly both outgoing / incoming staff exchanges could further strengthen existing academic mobility, international collaboration and research projects.

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

5.2.1. Opportunities for academic mobility of teaching staff are ensured

Erasmus+ is promoted for mobility/exchange. Teaching activities must contain at least 8 teaching hours per week (or over a shorter period). When discussing with teachers, it was confirmed that it is used often, as well as gaining in traction, when it comes to staff, as well as students, mentioned before.

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

The improvement of the competencies of the teachers of the University is conducted following the Guidelines for Improvement of Competencies of the Teachers of Higher Education Institutions. Teachers are familiarised with the latter, which makes it straightforward for them to know about advancements.

Around 58% (34 teachers) of teachers of Chemical Engineering study programmes received further training from EDU_Lab during the evaluation period (2020–2024). This is a quite high number, whereas

The university also conducts an annual employee satisfaction survey called “Atvirai” (“Openly”) where employees evaluate the microclimate of the university and faculty, their work, and other factors. It is mentioned that concrete follow up activities ensue, which is definitely commendable for faculty.

The opportunities for the development of existing teaching staff are actively ensured through the engagement in frequent scientific professional and didactic activities. Staff commonly attends at least one conference *per* year with the participation in international consortium initiatives, such as Horizon Europe, Twinning and MSCA DN projects, providing additional professional growth. All programme courses and materials are offered in English, supporting further teaching, internationalisation research skills. Professional staff quality is measured through publications, research project output and teaching quality performance, reflecting a balanced development approach. While no programme courses are mandatory online, staff have opportunities to innovate, enhance their teaching methods, and engage students.

ANALYSIS AND CONCLUSION (regarding 5.2.)

Existing teaching staff have the opportunities for mobility, supported by Erasmus+, Horizon and other research projects, though overall longer exchanges could be taken into account as well. Development is promoted through conferences, international project cooperation, and English courses. Staff professional quality is measured by the publications, research and teaching quality performance considering flexibility. Teachers are highly motivated, so a general presentation outcome is very positive.

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. Programme teaching staff is excellent, which is also evidenced by (most) students and industry.

RECOMMENDATIONS

To address shortcomings

1. No shortcomings

For further improvement

1. Digitalisation has to be integrated more in courses, as some are a bit out of date presently.
2. Longer exchanges of teaching staff could be taken into account for the following years.

AREA 6: LEARNING FACILITIES AND RESOURCES

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

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

As far as the premises have been inspected, they are entirely adequate. It would be desirable if two media could be played simultaneously in the larger lecture hall as well – specifically, the use of the blackboard (which can be and often should be a tool, especially for shorter explanations with sketches and the like) plus simultaneous projection of presentations is not possible – which is unfortunately a widespread error of the interior designers of teaching rooms and not of the University itself.

The state-of-the-art digital media equipment in the smaller classrooms is particularly impressive. The laboratories are generally very well equipped, but there are some minor safety issues (old labels and warning signs). The antique fume hoods, which are visually very attractive, historically interesting and worth preserving, but there are doubts about their safety.

Topics related to students with disabilities are discussed, but there is still space for improvement. Overall, with the exception of the already mentioned security questions, the laboratory facilities are adequate for students, easily accessible, and offer many good opportunities for development. Particularly noteworthy are the attractive learning spaces, whether the library or other study areas in the buildings shown. The library delivers very good online search possibilities and especially online resources in general.

To mention are the very good possibilities for internship at the industrial partner offered to the students.

The financial resources are adequate, based on what has been discussed and seen, but there is room for improvement – similar to many other universities in Europe. This issue must be addressed by the ministry. Efforts are underway to secure additional funding through project acquisition and industry collaboration.

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

In the discussion with the evaluation panel the KTU-management, teachers and students agreed that further development is necessary and they also agreed that further improvement of teaching and learning materials and laboratory facilities is an ongoing process and is being undertaken or is at least in the planning stage. As mentioned above, visits to various facilities have shown that most of the facilities are state-of-the-art with only some exceptions. Continuous investment is being made in the facilities, with some newly established/planned laboratory facilities as pointed out during the discussion with the management and the guided tour, offering the unique opportunity to integrate industrial processes and by that bridging from lab to plant as mentioned during the guided tour through the labs. Modern learning principles are adapted to the needs of the study topics. Some of the necessary investments must be financed through projects in collaboration with industry partners. SER Appendix 14 of the submitted documents contains clear information on the planned investments in study infrastructure. One planned investment, for example, concerns a mass spectrometry training device that is clearly intended for specific study modules. This also applies to extruders, centrifuges, cell incubators, laminar flow systems, equipment for the EDU lab, and, last but not least, general measures to improve study conditions and working conditions for students and for teaching staff. The proposed budget for the various tasks is reasonable.

ANALYSIS AND CONCLUSION (regarding 6.1.)

In conclusion, the facilities at the university are generally of good quality, mostly state-of-the-art. The classrooms, in particular, stand out for their advanced digital media equipment, while the laboratory spaces are also well-provisioned, though minor safety improvements, such as updating Signage lettering and addressing concerns with older equipment, are needed. The University posts a clear commitment to ongoing improvement, despite some challenges like issues surrounding accessibility for students with disabilities. The university excels in offering attractive learning environments for their students and goes for improving the working conditions for teachers. Strong industry partnerships provide students with valuable internship opportunities. While the financial resources appear to be sufficient, there remains potential for further investment, especially through collaborations with industry partners and project acquisitions. The small pilot-plants allow the transfer of small scale experiments to bigger levels. It is recommended to increase these lab resources for enhancing industrial collaboration. Overall, the university management, faculty, and students are aligned in recognizing the need for continual development, and efforts are already underway to address these areas as for example documented in the investment plan 2025-2028 (SER Appendix 14). The institution's dedication to adapting to modern educational needs and integrating industrial processes into its facilities is commendable, with further improvements planned to ensure that it remains at the forefront of higher education. In summary, it can be said that the facilities presented during the visit provide students in the master's program with excellent educational opportunities that are highly geared toward application on a larger scale. The learning facilities and resources for the bachelor's program are very good, and according to the on-site visit and discussions during the tour, there is still room for further improvement.

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

- In general: the teaching facilities for the first-cycle studies are very good, and for IInd cycle are excellent, providing very good learning opportunities.

RECOMMENDATIONS

To address shortcomings

- No shortcomings

For further improvement

- Improvement to allow students with disabilities to enroll in the study programmes.
- Continued expansion of laboratory infrastructure for students in both cycles.
- An upgrade of the laboratory equipment according to general international safety regulations is suggested.

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
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FACTUAL SITUATION

7.1.1. Internal quality assurance system for the programmes is effective

The University's internal quality assurance of studies is based on a holistic approach to the processes taking place at the University, assuming responsibility for the quality of studies and involving all stakeholders (students, academic staff, administrative staff, alumni, and employers) in the processes of improving study quality. In implementing its study quality policy, KTU seeks to make the University an attractive centre for students, academic staff, and administration, and to ensure that the University's portfolio of study programmes is competitive in the international arena and meets market expectations, national priorities, and prevailing trends.

The internal study quality assurance system is based on the main principles and guidelines for quality assurance in higher education in the European Union, the principal European higher education policy documents (the Bologna and Copenhagen Declarations; the Berlin and Bergen Communiqués; the London, Leuven, and Louvain-la-Neuve Communiqués; the Lisbon Recognition Convention; the Paris and Rome Communiqués), the European Qualifications Framework, European standards and

guidelines, and the main laws and legal acts of the Republic of Lithuania regulating higher education. The University's internal study quality assurance system is based on six essential elements: study governance, student-centred learning, academic staff, ensuring student success, monitoring of study quality, transparency, and impact on society.

In ensuring study quality, significant attention is paid to the development of academic staff competences, advanced teaching and learning methods, an inspiring teaching and learning environment, modern teaching and learning resources, and study organisation processes.

Activities aimed at ensuring study quality are carried out at all levels: the University, the first-level academic unit (faculty), the field of study and study programme, and the study module.

The University's study quality assurance includes a system of continuous and periodic monitoring, evaluation, and improvement measures. The main functions of internal monitoring and evaluation of study quality are carried out by the University Senate, the University Study Quality Committee, the Study Department, Faculty Study Committees, and Field Study Programme Committees, which periodically analyse and evaluate approved and implemented study programmes, the study process, study programme management, and the overall study programme portfolio. The study programme evaluation process provides an opportunity to update study programmes taking into account international trends in the development of science and studies, changes in the labour market, and proposals from students, academic staff, and employers. The faculty prepares a faculty study quality improvement plan focused on the development and improvement of studies and the assurance of study quality within the faculty. When there is a need to assess specific areas of study quality or organisation, non-periodic monitoring is also carried out at the University.

For continuous internal monitoring and evaluation of study quality, data collected and analysed in the University's information systems are used. KTU has implemented a study programme management model that enables the effective management of implemented fields of study and programmes and ensures study quality, activating Field Study Programme Committees and their chairs.

The Faculty Study Committee operates at the faculty and submits proposals and recommendations to the Dean on issues related to the development of the faculty's study programme portfolio and the formation of a study quality culture at the faculty. It is responsible for ensuring study quality at the faculty, provides support to Field Study Programme Committees and study programme managers in organising the implementation of study programmes, and ensures the quality of the delivered study programmes.

The management of study programmes in the field of Chemical Engineering is the responsibility of the CTF Chemical Engineering Field Study Programme Committee together with the study programme manager. With the involvement of social partners from business (industry representatives and employers), student representatives, and academic staff, the committee is responsible for ensuring the compliance of the content and implementation of the field of study and study programme(s) with University and external regulatory documents, for the selection and implementation of internal study programme quality assurance measures, and for the quality, continuous improvement, and achievement of objectives of the study programme(s). The Faculty Study Committee, together with the Dean of the faculty, prepares a plan for the development of the faculty's study programme portfolio and the improvement of study quality and, together with the Field Study Programme Committees, ensures its implementation, and reports on the results to the Dean of the faculty and the Vice-Rector for Studies.

During meetings with the SER team, administrative staff, social partners, and alumni, it was confirmed that surveys about the quality of the studies are carried out, and the collected information is analysed to improve the quality of the programmes.

A wide range of stakeholders are consulted during quality assurance (students, teachers, administrative staff, graduates, employers) which is actively used for the processes of improving the quality of studies. The university monitors quality assurance for its own (published metrics) and includes specific measures to assess:

- student admission data;
- students' progress and results;
- the career path of the University's graduates;
- student feedback on studies and study programmes;
- data related to students;
- the quality of the performance of teachers and their qualifications;
- course infrastructure and teaching/learning facilities;
- any other metrics pertinent to the performance of the University.

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

The assurance of study quality is based on the active involvement of the interested parties in the study process in contribution with teachers, researchers, students, graduates and employers. At the level of a study field and/or programme, social partners are involved in all processes relating to the preparation, quality assessment and improvement of study programmes, in accordance with their level of expertise. They are members of the Study Programme Committees for each field, the Qualification Commission and the Faculty Council. The university closely collaborates with employers, who play an active role in the assessment and improvement of study quality. Companies are regularly invited to participate in teaching activities and are consulted when industry-related problems arise, often seeking the university's expertise on how these issues can be solved. Employers from various sectors also take part in surveys and serve on committees dedicated to evaluating and enhancing the quality of study programs.

Students are actively engaged in the quality assurance programme. Student surveys are frequently carried out. Social partners, alumni and other stakeholders are also engaged through surveys and structured meeting programmes. It is clear from the site visit that student feedback is both analysed and acted upon. The engagement with active and previous students was clear and very favourable. All of the quality assurance data is published on-line and freely available. E.g. the most recent review of chemical engineering courses is available here: <https://www.eqar.eu/qa-results/search/by-report/report/?id=67474>. However, internal use (within the faculty) and its role in curriculum development was not immediately obvious except during the site visit interviews and more attention should be paid to this.

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

Information about the programs is provided in Appendix 1, which lists the courses of study. Appendix 6 and Appendix 7 present links between study outcomes and modules in the Chemical Technology and Engineering program and the Chemical Engineering program, respectively. The programs are described in detail.

Each academic year, the study program, its modules, and their coherence and content are reviewed and improved based on feedback from students, graduates, and employers, as well as recommendations from experts. These changes do not violate the general requirements applicable to the study program. The results of the feedback are presented each semester at the Rectorate and to the KTU Student Union. They are then discussed at faculty deans' offices and study program committees. Surveys are conducted, and, upon receiving comments or recommendations, discussions are held with the study program committee and the survey participants. If a decision is made to change or improve the program during a meeting, the information is published in "Moodle"

environment, where lecturers can describe module adjustments in accordance with the feedback received.

The university website provides the public with information on the programs of study offered, the admission requirements for applicants, fees of studies, study outcomes (and their links to teaching and assessment methods), program structures, accreditation data, awarded qualifications, career opportunities, descriptions of study modules, the value of the programs of study, the academic staff, opportunities to choose additional competencies, the results of study surveys, and the results of accredited fields of study and programs. Information about the university's study and research activities and its researchers is publicly available, ensuring the protection of personal privacy, intellectual property, and other rights and interests protected by law.

Data on study programmes of the field are made public in the open information, counselling, and guidance system (AIKOS), the Study Quality Assessment Centre, on the website of the Association of Lithuanian Higher Education Institutions for Centralised Admissions (LAMA BPO).

During the meetings it was confirmed, that surveys are carried out and programmes are revised after obtained feedback

7.1.4. Student feedback is collected and analysed

From the SER and from the meetings there is extensive evidence that all students in all modules provide feedback on course content and this is reviewed internally (within the faculty). A systematic and well-structured approach has been established at KTU for gathering and processing student feedback. This ensures that students' input plays an active role in quality assurance for the Chemical Engineering study field. Student feedback is gathered using multiple techniques such as questionnaires, roundtable discussions, and periodic interactions with group elders. The collected student feedback is not only saved but contributes to an analysis conducted at the program level and at faculty level among university instructors, with findings reported to individual teachers when appropriate. Student assessment receives immediate teacher input, increasing transparency and facilitating students' evaluation of their own study processes. Overall, KTU fosters openness and improvement processes and shows that students' feedback influences study processes at KTU.

ANALYSIS AND CONCLUSION (regarding 7.1.)

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

1. An excellent university led quality assurance programme defining mandatory requirements is in place
2. Students are actively engaged in quality assurance and their opinions listened to and acted upon
3. The wider stakeholders including industry/social partners and various university and national bodies are addressed within the quality assurance programmes

RECOMMENDATIONS

To address shortcomings

1. No shortcomings

For further improvement

1. The faculty based quality assurance data should be more visible and a dedicated page should be maintained and continually updated on the faculty web-site. This is a strong component of the course and should be highlighted.

V. SUMMARY

Following a review of all documents, the final conclusion is that the first cycle programme in Chemical Technology and Engineering and the second cycle programme in Chemical Engineering meet social and labour market needs. However, due to the small number of final theses related to renewable energy, it is recommended that this field will be expanded.

Both study programmes follow the national and the European standards and have a good potential of motivating national as well as international students to enroll in the attractive study programs. The students have access to elective courses in both cycles creating possibilities to personalize the curriculum for individual specialisation. The consistently high quality of teaching and program content provides excellent opportunities for job prospects.

It can be seen that KTU shows great initiative in supporting their students in all aspects of their study period. They offer comprehensive and easily accessible options for mobility, welfare, financial/psychological support. It can be seen from the factual situation that the students, teachers and administration work synergistically to encourage an environment for personal and academic growth.

KTU offers a research-led environment for teaching and the quality of its research is at an international level and is well respected nationally and further afield. Students have the opportunity to engage with high quality research projects and the course offers opportunities for research informed teaching. There is world-class, state of the art research laboratories and infrastructure and research is supported by the university. There is evidence of significant national and international grant income and project participation and this has helped enrich education and learning. Participation in schemes such as Erasmus enhancing student and researcher mobility is good. An important aspect is that the KTU supports the mobility of existing teaching staff through research and exchange projects. This is an area that also supports longer exchange stays. Development is promoted through conferences, international project collaborations, and English courses. The professional quality of employees is assessed on the basis of publications, research and teaching quality, and state-of-the-art measurement methods, while flexibility is guaranteed.

KTU and the course has a high quality, well thought out university led quality assurance programme defining mandatory requirements is in place. This information is freely available on-line for both students and other interested parties. Students are actively engaged in quality assurance and their opinions listened to and acted upon. The wider stakeholders including industry/social partners and various university and national bodies are addressed within the quality assurance programmes.

VI. EXAMPLES OF EXCELLENCE

Examples of excellence should include examples exhibiting exceptional characteristics that are, implicitly, not achievable by all.

Chemical engineering at KTU is world class. External rating agencies place it amongst the top 10% worldwide and this is an excellent performance and should be celebrated.

The high quality of the research should be applauded. It is clear that there are chemical engineers at KTU that have strong international reputations. This is reflected in citation rates, conference/seminar participation, grant funding and the quality of post-graduates.

The teaching laboratory infrastructure is modern and reflects considerable investment by both university and state bodies. The research infrastructure is also of a very high standard.

The wider facilities, research laboratories, teaching environment, and library are of the very highest quality.

The course deliverers are of very high quality, are very engaged in delivering very good teaching and strongly committed to and enthusiastic about maintaining and further improving courses.