



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO  
**PROGRAMOS *CHEMINĖ TECHNOLOGIJA IR*  
*INŽINERIJA (612H81001)***  
**VERTINIMO IŠVADOS**

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**EVALUATION REPORT**  
**OF *CHEMICAL TECHNOLOGY AND ENGINEERING***  
**(612H81001)**  
**STUDY PROGRAMME**  
**AT KAUNAS UNIVERSITY OF TECHNOLOGY**

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Išvados parengtos anglų kalba  
Report language - English

Vilnius  
2014

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<b>Cheminė technologija ir inžinerija</b>
Valstybinis kodas	612H81001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Chemijos ir procesų inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	Nuolatinė (4), iššęstinė (6)
Studijų programos apimtis kreditais	240
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Chemijos inžinerijos bakalauras
Studijų programos įregistravimo data	1990-10-31

## INFORMATION ON ASSESSED STUDY PROGRAMME

Name of the study programme	<b>Chemical Technology and Engineering</b>
State code	612H81001
Study area	Technological Sciences
Study field	Chemical and Process Engineering
Kind of the study programme	University studies
Level of studies	First
Study mode (length in years)	Full-time (4), part-time (6)
Scope of the study programme in credits	240
Degree and (or) professional qualifications awarded	Bachelor in chemical engineering
Date of registration of the study programme	1990-10-31

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## I. INTRODUCTION

The external assessment of the study programme *Chemical Technology and Engineering* (state code - 612H81001) of Kaunas University of Technology (hereafter KTU) was initiated by the Centre for Quality Assessment in Higher Education of Lithuania (SKVC) nominating the external assessment expert group formed by Professor Michel Troquet (Blaise Pascal University of Clermont-Ferrand, France - team leader), Professor Jan Lundell (University of Jyväskylä, Finland), Professor Carlos Nieto de Castro (University of Lisbon, Portugal), stakeholder representative Mr. Giedrius Mažūnaitis (The Association of Lithuanian Chemical Industry Enterprises, Lithuania) and student representative Ms. Kristina Daniūnaitė (PhD student, Vilnius University, Department of Botany and Genetics, Lithuania).

The evaluation of the study programme *Chemical Technology and Engineering* (state code - 612H81001) made use of the legal and regulatory information, and methodological guidelines provided to the Expert Team by the SKVC, as well as the Self-Evaluation-Report (SER) prepared by the assessed unit.

The basis for the evaluation of the study programme (hereafter, the programme) is the SER, written in September 2013, its annexes and the site visit of the expert group to Kaunas University of Technology (hereafter, the University) on 26th February 2014. The visit incorporated all required meetings with different groups: the administrative staff of the Faculty of Chemical Technology, staff responsible for preparing the SER, teaching staff, students representing all years of programme action, alumni, and social partners. The expert group inspected various support services (classrooms, laboratories, library, computer facilities), examined students' final works, and various other materials.

KTU distinguishes itself by deep traditions of university studies in the area of technological sciences. Its mission is to provide “...*research-based studies of international level, to create and to transfer knowledge and innovative technologies for sustainable development and innovative growth of the country...*” according to SER.

KTU is the only university in Lithuania which trains Bachelors in Chemical Engineering. According to the SER, the programme is answering the demand of creative scientists in industry.

The students have the option to specialize, for example, in the areas of fertilizers, ceramics, binding materials, as well as textile, polymer, paint, fur, oil, and biotechnology.

The first cycle study programme of *Chemical Technology and Engineering* has been implemented at the Faculty of Chemical Technology since 1990. The programme has been accredited in 2000 until April 4, 2002. Afterwards, the accreditation of Chemical Technology and Engineering Bachelor Study Programme was extended until August 31, 2009 and it was renewed again until December 31, 2011 by the order of the Minister of Education and Science of the Republic of Lithuania on August 17, 2009, No. 1-73.

The previous external assessment in 2011 formulated numerous comments and recommendations:

- An analysis and study of the European Federation of Chemical Engineering (EFCE) recommendations: [http://www.efce.org/Bologna\\_Recommendation.html](http://www.efce.org/Bologna_Recommendation.html) for the first and second degree in chemical engineering is strongly recommended in order to clarify the aims and learning outcomes of the KTU degree in chemical engineering.
- An organisation of the subjects in modules connecting the subjects in the curricula with the learning outcomes is recommended.
- A deeper insight into the integration of theory and practice (laboratory and/or industrial) in the curriculum and learning outcomes is necessary.
- An exploration of the possibility to share some modules of knowledge with the Applied Chemistry degree is advisable.
- Establish closer technical and/or academic contacts with international partners for staff and students exchange.
- Try to reach the goal and increase the dissemination of the information that KTU is the institution of excellence in Lithuania for Chemical Engineering at a national and international level.
- A strategic plan to develop specific infrastructures and/or facilities for the chemical engineering studies.
- A specific plan to adapt learning resources to the new Information Technologies is recommended.
- Perform an analysis, of the study process and student assessment related to the employers demand.
- Introduce more stakeholders (industry and/or related services) in the evaluation procedures.
- Develop and apply a specific systematic internal quality assurance system for the degree.

The following Departments are involved in implementation the programme: Department of Organic Chemistry, Department of Organic Technology, Department of Silicate Technology, and Department of Physical Chemistry, as well as several Departments of other faculties

incorporating their own areas of specialization. Since the last external evaluation in 2011, 54 students graduated from this programme.

The Expert Team feels that the provided documentation was sufficient and as thorough as could be expected. All comments and recommendations are formulated by common assent of the expert team members and offered with the intention of ensuring that the programme achieves the highest level of quality consistent with its high aspirations and facilitates the Committee of the Study programme (SPC) in its work for passing the accreditation resolution.

## II. PROGRAMME ANALYSIS

### *1. Programme aims and learning outcomes*

The programme aims are well-defined. They are related to the type and cycle of studies and the purpose of the programme. The programme providers target to training of the broad erudition Bachelors in chemical engineering, who will think creatively and analytically, will have knowledge and skills needed for the use of high technologies, will be able to apply their knowledge and skills in their engineer activities and solve practical chemical engineering problems, will be able to integrate creatively the knowledge of engineering, business and management.

The aims and learning outcomes are clearly-formulated and publicly accessible, communicated on University webpage, as well as communicated to stakeholders via mutual meetings and dissemination of printed information. The aims and learning outcomes were formulated according to the EUR-ACE Framework Standards for the Accreditation of Engineering Programmes and correspond to the requirements on the institutional, state and international level. The contents and learning outcomes stated for the programme represent a compatible set of targets in comparison with the aims of the programme. The learning outcomes are grouped into the following categories: Knowledge and understanding, engineering analysis, Engineering design, Investigation, Engineering practice and Transferable skills. All the stated learning aims in SER are connectible with aims stated above, i.e. provide basic engineering education in order to provide the graduates a many-faceted view and skills to work in scientific industrial context. Moreover, the basic skills and competencies targeted for within the programme also act as a stepping board for second-cycle studies in the same University.

Learning outcomes are consistent with the type and level of studies and the level of the qualification offered in targeting to develop basic learning and research skills in the programme's field of expertise. However, the topics of some courses, especially in the last two years of the studies, are too highly specialized (in particular: Chemorheology, Engineering of Mechanical Process, Modeling and Optimization of Processes) for the Bachelor level. This is especially evident, if one considers the aims of the programme targeted to deliver a broad and basic training to operate in scientific industrial context. Based on the course contents made available to the Expert Team, the above mentioned topics could benefit both the programme and the student development in a lesser extent but with a larger focus on practical hands-on practices. Thus should be reconsidered to lay more focus on basic skills and capabilities. It is the understanding of the Expert Team – both based on the SER and the interviews – that learning outcomes should be increasingly based on academic and professional requirements and reflects the needs of the labour market instead of the current situation, where the programme activities reflect more the research activities in KTU than the fastly developing industrial context. This was clearly stated by the social partners during the site visit. Nevertheless, the programme is well-focused on public needs and provides the “*properly trained people*” with good theoretical knowledge and basic skills as expected by the industry.

## ***2. Curriculum design***

The programme is designed in accordance with the laws and directives applicable in Lithuania and European Union (EU) and it formally meets these requirements. The duration of the programme is 4 years for full-time and 6 years for part-time studies with the total volume of 240 ECTS credits (30 ECTS for full-time and 20 ECTS for part-time studies per semester). Not more than 7 subjects are taught during the semester.

The curriculum consists of the general university education subjects, core and compulsory subjects, a large number of electives, practice and final degree project. General university subjects like mathematics, physics and sub-disciplinary basic chemistry are dominant during the first year of studies. Even though these subjects are important for the engineering training, there seems to be a lack of obvious connections with the aims and learning outcomes of the programme, as was expressed by students and graduates during the site visit. As it happens, the usefulness of all the studied subjects become evident only at a much later time of studies. Specialization subjects are delivered in final three semesters as electives, and the students can have their own decision on their research profiles on their own interests.

Study subjects are evenly spread and their names and content are not repetitive based on the assessment material provided to the Expert Team. The content of the subjects is consistent with the type and level of the studies in general, with respect to European counterpart educators. However, starting from the 5th semester the studies of electives are overlapping core and compulsory subjects, which could be exhaustive as a study programme combined with research projects going on simultaneously. Many of the courses at this stage represent more specialized fields new to the students, and there could be a risk that such course tray might not serve the training of basic skills and capabilities as there appears to be not so obvious connections between the specialized courses and the overall learning targets of the programme. The electives could be more focused on supporting the core and compulsory subjects rather than deeply specializing in certain areas by a clearer connection to the compulsory study load. The revision of the learning outcomes would be advisable in improving the content of elective courses and vice versa. In general, the electives represent a set of studies which could act as an extended motivating factor for enhanced methodological skills and knowledge instead of a plethora of scientific content knowledge. As it is, the content and methods of subjects are sufficient to ensure the achievement of learning outcomes, and the content attempt to reflect the latest achievements in science and chemical technologies.

Basic knowledge skills are very well covered with a large number of subjects and they are easily adapted by the students, however, more attention might be required in development of problem solving skills in new environment. Moreover, Safety, Quality and Environmental Management topics should be taught in a more integrated manner and should be enforced in an everyday practice, as the deficiency of the skills in these areas was indicated by the employers.

There is integration between the teaching methods and practice, although some of the teachers lack a strong general vision of what students have to learn as noticed during the interview.

The volume of common subjects with the study programme of the Bachelor "*Applied chemistry*" is obvious. There is significant overlap within the two Bachelor programmes (Chemical technology and engineering vs. Applied chemistry). It could be beneficial to connect both programmes at least over the first two years. This would give a better starting point for specialization and further studies. At the same time it would ease the administration and teacher engagement in the various programmes, without a real drop of level and content knowledge within the programmes.



### *3. Staff*

The qualification of the teachers working in the programme corresponds with the requirements for the first-cycle study programmes indicated in legal acts and is sufficient for its successful implementation. The subjects are taught by 29 teachers (14 of which are professors), all having doctoral degree, and the average pedagogical and practical experience is about 20 and 26 years. All teachers are employed for a 5-year period after which they are evaluated, based on their academic and research activities. According to the information provided in the annexes of SER and confirmed during the interview with the teachers, research interests of the teaching staff are in compliance with the study field of the subjects taught. Therefore, the qualifications of the staff are adequate to ensure learning outcomes.

The number of teaching staff is sufficient for the successful continuation of the programme.

The ratio of teachers and students is around 1:4 for this study programme, which is a good value within European standards. However, the large number of contact hours for some teachers raises the concern that teachers might lack time to perform research activities and improve their professional competencies. Therefore, the revision of the distribution of teaching duties should be regularly performed. Although it is evident that some teaching responsibilities are transferred to doctoral students and laboratory technicians, this is not always reflected in the workload distribution which, in this way, might be overestimated for some teachers.

The age distribution of the staff (51 years on average) is acceptable for the sufficient provision of the programme. New young teachers that come to the Programme are mostly graduates of the faculty; therefore it would be beneficial to attract more teachers from other institutions that could bring new experiences and insights in the Programme's development. Long-term management of teachers' turnover should be implemented.

KTU creates very good conditions for professional development of the teaching staff expressed by the infrastructure (i.e. library, offices and laboratories) and working environment, i.e. collaboration and scientific mentoring. The facilities are very adequate for personal development and Faculty actions give also opportunities to pursue individual scientific paths. Moreover, there exist Faculty-wide activities in support of complementary pedagogical techniques for education, as the staff has the opportunity for voluntary university pedagogical training. There exists also internationalization support in the form of opportunities to visit foreign countries, and the Faculty encompasses good contacts with the stakeholders, namely chemical and associated industries companies, which create opportunities of industrial collaboration. The average age of the teaching staff is lower than 50 years, which can be taken as a good sign of a young and

dynamic group. In the upcoming few years the situation of staff turnover is not alarming, but in the long run there will be a Faculty-wide need for strategies and measures. The Expert Team also notes that there is a need to step up the employment Information and Communication Technologies (ICT), which could have a profound impact of training and research in the upcoming years. This needs to be connected with Faculty level strategies of education , research and staff competence enhancements.

The number of technical staff that provides laboratory technical support in the main supporting Departments is adequate.

#### ***4. Facilities and learning resources***

The programme has a number of premises which are absolutely adequate both in their size and quality for the implementation of study process. The infrastructure within the faculty includes lecture halls, laboratories, computer classes (one of which is especially dedicated for process simulation), the library. The laboratories are well-equipped with operative and safe laboratory equipment and supported by maintenance. Modern equipment for spectral analysis, gas chromatography and HPLC, thermal and x-ray structure analysis are available. There are two commodious specialized Chemical Engineering laboratories: one equipped with several pilot plants and momentum, heat and mass transfer units (14 in total), another with two chemical reactors. Further development of research laboratories and auditoriums are in the future plans of the faculty. Industrial connections and support from industrial partners in the process of development of the facilities and learning resources is commendable and should be further encouraged by the responsible bodies of the faculty.

Auditoriums and computer classes are all equipped with modern multimedia and necessary software used for technological and engineering studies. The teaching materials are adequate and easily available to the students. The library of the KTU Faculty of Chemical Technology has 41 workplaces, 8 of which are computerized. It contains sufficient amount of technical books, journals, monographs, textbooks, and other literature resources. Students can also use the Central Library. Students have access to a number of databases which are available from the library computers. Most of the literature needed for the programme is available at the library or methodological rooms of the coordinating departments. Students also use the methodological material prepared by the teachers, which is also available in electronic format. Internet connection is available in the premises.

The Faculty has adequate arrangements for students' practical placements. The requirements and implementation of practical training are discussed among supervisors and social partners as confirmed during the meetings. It is rather common that students are employed at the enterprise after their practice period. Therefore, practice outside the teaching premises should be further enhanced.

### ***5. Study process and student assessment***

Students are admitted in accordance with general procedures for joint admission. Admission requirements are well-founded, clearly formulated and presented on the website of KTU (<http://ktu.edu>). Candidates having at least secondary or equivalent education can participate in the entry competition. The main admission criterion is a competitive score. Students are mostly state funded. However, high student drop-out rates (even reaching  $\geq 50\%$ ) are of great concern. This indicates that the purpose of the programme, aims and intended learning outcomes might not be very clear to entrants and/ or the content of the programme does not meet their expectations. Moreover, the popularity of the programme among the entrants has been decreasing for the last several years since the introduction of a study programme of Industrial Biotechnology in 2011, which originated from the programme being evaluated.

The studies are organized into autumn and spring semesters, which both include 16 weeks. The number of contact hours is high (8 hours per day or 36 hours per week), which leaves not much time for students' individual work – a strong requirement of the Bologna Process, therefore it should be carefully revised and reduced. As the main facilities used for the teaching process are located in the same area, rational timetables could be drawn, which would satisfy students' needs for self-study as well as extracurricular activities even better.

As stated in SER and confirmed during the site visit, the programme is implemented by applying various methods of teaching and learning (e.g. scientific literature analysis, projects, reports and their presentations) which ensures adequate provision of the study process. Student assessment is based on a cumulative grade principle which motivates students to be actively involved in the study process during the whole semester and ensures no work overload during the session period. However, the requirements and evaluation criteria need to be better harmonized among the departments to ensure that the learning outcomes of all study subjects in the programme are assessed properly.

Students' achievements are assessed on a criteria-based proportional ten-point scale, which is clear, adequate to the programme and publicly available. Self-study assignments possess weighted coefficients. They are introduced to students by the teachers at the beginning of the semester; furthermore, the evaluation criteria should be more thoroughly explained to the students. Studies end with a public final thesis defence procedure.

Students participate in various research activities from the early years of studies, what is indicated by the increasing number of scientific publications. Students regularly present their research at the students' research conferences and some of them even have published scientific articles before the defense of the final thesis.

Students have a possibility to participate in student mobility programmes and during the last 4 academic years 16 students of the programme participated in ERASMUS. The information is available on the University's webpage and students are encouraged during information event which is held once a year. However, based on the student interviews, there is no clear view by the students how courses taken abroad would benefit their advancement in the programme. Even though the studies abroad are checked and accepted by the University, there is no transparent policy to substitute KTU courses with courses taken abroad. Thus, students are not willing to participate in mobility programmes being afraid to have academic debts after their return, which was clearly stated by the interviewed students and alumni during the interviews. Therefore, immediate measures to overcome this issue are strongly suggested by the expert team, as it was also mentioned in the report of the previous evaluation.

The higher education institution ensures strong academic and social support for the students at the department, faculty or university level. The Vice Dean and curators acquaint students with the departments, introduce general rules. Teachers consult students at office hours (publicly available), help to choose specialization during the second year of studies. Information about employment possibilities is obtained during meetings with potential employers at "Career Days". Students are provided with social support and advanced ones are awarded incentive scholarships. Joint-stock companies like "Achema", "Akmenès cementas" have established special scholarships for the best students of the programme. Students can participate in various cultural and sports activities. The needs for the accommodation at student dormitories are fully met.

The knowledge and skills of the graduates completely meet the programme providers' expectations. They successfully find jobs at various commercial and scientific enterprises, what shows that graduates' qualification fully meets employers' needs, what was clearly stated during

the meetings with social partners and alumni. Many graduates are already employed during their studies or soon after graduation. And the majority ( $\geq 80\%$ ), satisfied with the provided education at the KTU, choose to deepen their knowledge in Master study programmes.

## ***6. Programme management***

The programme is managed at department, faculty and university levels. The bodies involved in the management process include the Vice Rector for Studies, Divisions of Study Quality and Monitoring Office and Studies Office, Programme Coordinator, while the main responsibilities are allocated to the Study Programme Committee (SPC). However, the decision-making process, allocation of particular responsibilities and coordination of the programme monitoring lack clarity, as agreed by the experts.

The programme is reviewed at regular meetings of SPC, which appears to be the main body responsible for identifying and implementing changes in the programme. However, after reading SER and during the site visit it remained unclear whom makes the final decision if particular improvements are necessary. The content of the programme and learning outcomes are discussed at the beginning of each academic year with teachers, social stakeholders and students. The teachers and heads of the departments are responsible for the renewal and quality of the coordinated subjects. Teachers can change about up to 20% of course content by their own initiative and without addressing the SPC, however, it was indicated during the meeting that even in this case it is discussed informally with SPC or the Programme Coordinator. Changes in learning outcomes or requirements need approval from the higher level of managing body. There is no evidence for assessment of the changes suggested by the teachers.

Information and data on the implementation of the programme are constantly collected and analysed by referring to the structure of the Internal Study Quality Guarantee enacted by the laws of the University Senate. The general Quality Assurance System is very new and the progress is going on at the University level. But there is still lack of awareness by the administrative and teaching staff about its utility and the outcomes of the Quality Assurance System are not fully implemented at a faculty and department levels yet.

At the end of each semester students are asked to fill anonymous questionnaires, which are discussed at the meetings of the departments or Dean's Office, however the return percentage of answers is relatively low as the students do not seem to be well-motivated to get involved in the programme management process. Despite these surveys, there is no other evident systematic data

collection and the expert team has found lack of traces of decisions or actions made based on the data collected.

The involvement of social partners in the evaluation and development processes has improved a lot since the last accreditation. They are members of SPC, qualification commissions evaluating Bachelor thesis defense, the Board of Faculty. They can also be involved in the revision of learning outcomes. Employers interviewed during the meeting confirmed that they had informal input via personal contacts with the Faculty members and via a member of the SPC, however this process needs to be further developed in a more official manner. Students' representatives are also members of SPC and the Board of the Faculty. Involvement of graduates in the programme management process could also bring long-term benefits, as it appears that at present the graduates only keep informal connections with their teachers.

### III. RECOMMENDATIONS

The previous main recommendations were performed : connection of learning outcomes with modules, sharing of the modules of knowledge with the Bachelor *Applied Chemistry*, communication on the vision and the excellence of the university, development of infrastructures and facilities.

Other points quoted in the previous evaluation can be still improved: the relation between theoretical and practical trainings, the adaptation of the student training to the new technologies, the assessment of the competence of the students, the implication of stakeholders at all the levels of the training process and the internal quality assurance system for the degree.

After the reading of the SER and the various meetings the group of experts also recommends:

1. Learning outcomes is strictly the programme outcomes of the EUR-ACE Framework-Standards. At no time appear specific skills and abilities connected to the discipline. A description of learning outcomes in three classes: general (EUR-ACE), specific (Chemical Engineering), transverse (Social skills) are imperative to define better the profile of the graduates.
2. The electives should be focused more on the core of the training: the chemical engineering. In this connection it is maybe necessary to rethink the title of the programme. If and when the programme focuses on basic skills and competences, the term *technology* in the title might not be needed. The Bachelor programme seems to be highly connected with the conjunctive Master programme. From a more efficient training programme point of view, it would be advisable that the Master programme in Chemical engineering and Bachelor programme in Chemical engineering and technology would form a tight-binding continuum.

It is noted by the Expert Team that the duration of the Bachelor studies is four years, which is not in sync with most of the European countries (three years). This disjunction could be disfavor the international exchange programmes and could introduce a misunderstanding on the profile of skills of the graduates, as well as causing the programme graduates an impeccable time lag compared with their European peers.

However, the Expert Team acknowledges that this is due to National regulations in Lithuania, and thereby it can't be affected by KTU alone. As this is presented here as a suggestion, this is something that should be recommended for the Ministry of Science and Education in modifying the Lithuanian science training into the mode of the European research Area.

On the assessment target here, merging of the Bachelor study programme (in Chemical Technology and Engineering, 612H81001) with this Master study programme in Chemical Engineering (621H8004) in an Integrated Master in Chemical Engineering of 5 years, thereby replacing the actual 4+2 organization, would benefit the administration, curriculum development, pedagogical development, content and enhance the learning possibilities of this unique training now offered in Lithuania – and appreciated and needed by the surrounding society.

3. The workload of the students and the teachers must be more balanced and the training of the teachers to the new pedagogies and to the use of information technologies would value the programme.
4. The clarification of the management of the programme and the decision-making between the various authorities is imperative. A clear and well-planned administrative approach to the development of the programme needs to be connected with the strategic planning of the Faculty. The responsibilities and actions of the various administrative bodies connected with the programme should be made more transparent and easier to adhere by the students and the Faculty members, even though administrative level decisions (Rector's order A-128) do exist.
5. The volume of common subjects with the study programme of the Bachelor "*Applied chemistry*" is obvious. There is significant overlap within the two Bachelor programmes (Chemical technology and engineering vs. Applied chemistry) where curriculum development and management of the programmes could benefit of connecting of both programmes at least over the first two years.



#### IV. SUMMARY

The most positive points raised in the reading of the SER and during the various meetings are: the motivation of the students, the number and the quality of teaching staff and technical facilities.

However, not much evidence of following the recommendations from the previous evaluation are present, although the expert team admits that due to the current state of changing operational environment the assessment of implemented improvements is complicated and some major changes are still ahead.

The volume of common subjects with the study programme of the Bachelor "*Applied chemistry*" is obvious. There is significant overlap within the two Bachelor programmes (Chemical technology and engineering vs. Applied chemistry) could benefit of connecting of both programmes at least over the first two years. Besides, the workload of the teachers is heavy when two programmes are simultaneously operated. At no time appears a cost analysis of the programme and nevertheless it is a fundamental element of management that must be taken into account.

Finally, in the same order of idea the implementation of the Quality Assurance is imperative, this recommendation was already reminded in the previous evaluation but the implementation is not clearly established both in the SER and in the different interviews.

## V. GENERAL ASSESSMENT

The study programme Chemical Technology and Engineering (state code – 612H81001) at Kaunas University of Technology is given **positive** evaluation.

*Study programme assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Staff	3
4.	Material resources	4
5.	Study process and assessment (student admission, study process student support, achievement assessment)	3
6.	Programme management (programme administration, internal quality assurance)	2
	<b>Total:</b>	<b>19</b>

\*1 (unsatisfactory) - there are essential shortcomings that must be eliminated;

2 (satisfactory) - meets the established minimum requirements, needs improvement;

3 (good) - the field develops systematically, has distinctive features;

4 (very good) - the field is exceptionally good.

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Grupės nariai:  
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Kristina Daniūnaitė

**KAUNO TECHNOLOGIJOS UNIVERSITETO PIRMOSIOS PAKOPOS STUDIJŲ  
PROGRAMOS *CHEMINĖ TECHNOLOGIJA* (VALSTYBINIS KODAS – 612H81001)  
2014-07-24 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-416 IŠRAŠAS**

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## V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa Cheminė technologija ir inžinerija (valstybinis kodas – 612H81001) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	3
4.	Materialieji ištekliai	4
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	3
	<b>Iš viso:</b>	<b>19</b>

\* 1 - Nepatenkinamai (yra esminių trūkumų, kuriuos būtina pašalinti)

2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)

3 - Gerai (sistemiškai plėtojama sritis, turi savitų bruožų)

4 - Labai gerai (sritis yra išskirtinė)

&lt;...&gt;

## IV. SANTRAUKA

Skaitant savianalizės suvestinę ir dalyvaujant įvairiuose susitikimuose vizito metu nustatyti šie privalumai: studentų motyvacija, dėstytojų skaičius ir kokybė bei techninė materialioji bazė.

Tačiau matyti, kad nebuvo pakankamai atsižvelgta į per ankstesnį vertinimą pateiktas rekomendacijas, nors ekspertai pripažįsta, kad dėl šiuo metu besikeičiančios situacijos sudėtinga vertinti įgyvendintus patobulinimus, be to, kai kurie pagrindiniai pokyčiai dar bus atlikti ateityje.

Daug šios studijų programos dalykų sutampa su bakalauro studijų programos *Taikomoji chemija* dalykais. Pastebimas dviejų bakalauro studijų programų (*Cheminės technologijos ir inžinerijos* bei *Taikomosios chemijos*) persidengimas, todėl būtų naudinga abi programas sujungti bent jau pirmus dvejus studijų programos metus. Be to, kai tuo pačiu metu vykdomos dvi programos, dėstytojų darbo krūvis yra didelis. Atrodo, kad niekada nebuvo atlikta šios programos sąnaudų analizė, kuri yra esminis vadybos elementas, į kurį reikėtų atsižvelgti.

Pratęšiant tą pačią mintį, būtina įgyvendinti kokybės užtikrinimą. Ši rekomendacija jau buvo pateikta per ankstesnį vertinimą, tačiau, ar ji buvo įgyvendinta, nėra aišku nei skaitant savianalizės suvestinę, nei paaiškėjo dalyvaujant įvairiuose susitikimuose vizito metu.

### III. REKOMENDACIJOS

Įgyvendintos pagrindinės per praeitą vertinimą pateiktos rekomendacijos: susieti studijų rezultatus su moduliais, bendrai dėstyti žinių modulius iš *Taikomosios chemijos* bakalauro studijų programos, skleisti informaciją apie universiteto viziją ir kompetenciją, gerinti infrastruktūrą ir patalpas.

Kitus ankstesniame vertinime pateiktus punktus dar būtų galima tobulinti: ryši tarp teorinių ir praktinių mokymų, studentų mokymo pritaikymą prie naujų technologijų, studentų kompetencijų vertinimą, socialinių dalininkų įtraukimą į mokymo procesą visuose lygmenyse ir vidinę kokybės užtikrinimo sistemą laipsniškai suteikiančiai studijų programai.

Perskaičiusi savianalizės suvestinę ir po susitikimų su įvairiomis grupėmis vizito metu ekspertų grupė rekomenduoja:

1. Studijų rezultatai turi griežtai atitikti EUR-ACE sistemos studijų programų standartus. Neįtraukti specialieji su disciplina susiję įgūdžiai ir gebėjimai. Studijų rezultatai turi būti aprašyti trijose gebėjimų grupėse: bendrieji (EUR-ACE), specialieji (chemijos inžinerijos) ir perkeliemieji (bendravimo įgūdžiai) būtini, siekiant geriau apibrėžti absolventų profilį.

2. Pasirenkamieji dalykai turėtų būti labiau sutelkti į studijų esmę: chemijos inžineriją. Šiuo atžvilgiu gali tekti persvarstyti studijų programos pavadinimą. Jeigu/kai studijų programoje daugiausiai dėmesio skiriama baziniams įgūdžiams ir gebėjimams, termino „technologija“ gali nebereikėti. Atrodo, kad bakalauro studijų programa labai susieta su atitinkama magistro studijų programa. Siekiant efektyvesnių studijų, patartina, kad *Chemijos inžinerijos* magistro studijų programa ir *Cheminės technologijos ir inžinerijos* bakalauro studijų programa būtų itin glaudžiai susietos.

Ekspertų grupė atkreipė dėmesį, kad bakalauro studijos trunka ketverius metus, o tai neatitinka daugelio Europos šalių praktikos (treji metai). Dėl šios neatitikties tarptautinės mainų programos gali būti nepatrauklios ir kilti nesusipratimų dėl absolventų įgytų gebėjimų, taip pat studijų programos absolventams studijos užtrunka ilgiau, palyginti su jų kolegomis kitose Europos šalyse.

Vis dėlto ekspertų grupė pripažįsta, kad tokia situacija susiklostė dėl Lietuvoje galiojančių teisės aktų, todėl su šiomis pasekmėmis susiduria ne tik KTU. Siūlome Švietimo ir mokslo ministerijai rekomenduoti pakeisti Lietuvos mokslinį rengimą pagal Europos mokslinių tyrimų erdvės nuostatas.

Vertinimas parodė, kad suliejus bakalauro studijų programą Cheminė technologija ir inžinerija (612H81001) ir Chemijos inžinerijos magistro studijų programą (621H8004) į integruotą penkerių metų trukmės Chemijos inžinerijos magistro studijų programą, pasikeistų dabartinė 4+2 organizacinė struktūra, o tai būtų naudinga administravimui, studijų programos sandaros tobulinimui, pedagoginiam tobulėjimui, turiniui ir išplėstų galimybes studijuoti unikaliose šiuo metu Lietuvoje vykdomose studijose, kurias vertina visuomenė ir kurios jai reikalingos.

3. Studentų ir dėstytojų darbo krūvis turi būti subalansuotas, o dėstytojams skirti naujų pedagoginių metodų ir informacinių technologijų naudojimo mokymai būtų naudingi studijų programai.

4. Studijų programos vadyba ir įvairių vadovų sprendimų priėmimas turi būti aiškesnis. Aiškus ir gerai suplanuotas administracinis studijų programos tobulinimo metodas turi būti susietas su fakulteto strateginiu planavimu. Įvairių administracijos padalinių, susijusių su studijų programa, atsakomybė ir veiksmai turėtų būti skaidresni ir lengviau pritaikomi studentams ir fakulteto personalui.

5. Daug šios studijų programos dalykų sutampa su bakalauro studijų programos *Taikomoji chemija* dalykais. Pastebimas dviejų bakalauro studijų programų (*Cheminės technologijos ir inžinerijos* bei *Taikomosios chemijos*) persidengimas, todėl šių programų sujungimas bent jau pirmus dvejus studijų programos metus būtų naudingas siekiant tobulinti studijų programos sandarą ir vadybą.

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Paslaugos teikėja patvirtina, jog yra susipažinusi su Lietuvos Respublikos baudžiamojo kodekso<sup>1</sup> 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

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<sup>1</sup> Žin., 2002, Nr.37-1341.