



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO
STUDIJŲ PROGRAMOS *BRANDUOLINĖ ENERGETIKA*
(valstybinis kodas 621E32001)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF *NUCLEAR ENERGY* (state code 621E32001)
STUDY PROGRAMME
at KAUNAS UNIVERSITY OF TECHNOLOGY

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Išvados parengtos anglų kalba
Report language – English

Vilnius
2015

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Branduolinė energetika</i>
Valstybinis kodas	621E32001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Energijos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinė (2 metai), iššęstinė (3 metai)
Studijų programos apimtis kreditais	120 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Branduolinės energijos inžinerijos magistras
Studijų programos įregistravimo data	Lietuvos Respublikos švietimo ir mokslo ministro 2008 m. gegužės 21 d. įsakymu Nr. ISAK-1444.

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Nuclear Energy</i>
State code	621E32001
Study area	Technological Sciences
Study field	Energy Engineering
Type of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full-time studies (2 years), part-time studies (3 years)
Volume of the study programme in credits	120 ECTS
Degree and (or) professional qualifications awarded	Masters of Nuclear Energy Engineering
Date of registration of the study programme	21 st May 2008, under the Order of the Minister of the Ministry for Education and Science of the Republic of Lithuania No. ISAK-1444.

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 The Centre for Quality Assessment in Higher Education

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I. INTRODUCTION

1.1. Background of evaluation process

The evaluation of on-going study programmes is based on the **Methodology for Evaluation of Higher Education Study Programmes**, approved by Order No 1-01-162 of 20th December 2010 of the Director of the Centre for Quality Assessment in Higher Education (hereafter, SKVC). Evaluation is intended to help higher education institutions constantly to improve their study programmes and to inform the public about the quality of studies.

The evaluation process consists of the main stages: 1) *Self-evaluation and the Self-evaluation Report prepared by a Higher Education Institution (hereafter, the HEI)*; 2) *a visit of the Review Panel to the higher education institution*; 3) *preparation of the evaluation report by the Review Panel and its publication*; 4) *follow-up activities*.

On the basis of the study programme's external evaluation SKVC takes a decision to accredit the study programme either for 6 years or for 3 years, or not to accredit it.

The programme is **accredited for 6 years** if all evaluation areas were evaluated as "very good" (4 points) or "good" (3 points).

The programme is **accredited for 3 years** if none of the areas was evaluated as "unsatisfactory" (1 point) and at least one evaluation area was evaluated as "satisfactory" (2 points).

The programme is **not accredited** if at least one of evaluation areas was evaluated as "unsatisfactory" (1 point).

1.2. General

The application documentation submitted by the HEI follows the outline recommended by SKVC. Along with the Self-evaluation Report and Annexes, the following additional documents were provided by the HEI during the site-visit:

No.	Name of the document
1.	Samples of examination papers
2.	Samples of thesis (project report) submissions

1.3. Background of the University/Faculty/Study field/Additional information

The mission of Kaunas University of Technology (hereafter, KTU) is defined in a way similar to those of other European leading universities. The SER states that the “Mission of Kaunas University of Technology is to provide research-based studies of international level,” that the “Vision of Kaunas University of Technology is to be a leading European university,” and that the “Structure and staff activities of the University are oriented towards research and innovations in the area of fundamental sciences and technologies.” KTU seems to be well linked internationally. The Review Panel notes with satisfaction that “Funds from international research programmes comprise 25 percent of KTU's annual research budget; 46 percent of R&D capital comes from foreign companies (2013).” The structure of the University resembles that of similar institutions in Europe and overseas. The study programmes have been converted from the former Diploma to the European Bachelor-Master’s scheme.

Preparation of nuclear energy engineers began at Kaunas Polytechnic Institute in 1975, (since 1990 – Kaunas University of Technology). 56 diploma engineers in nuclear engineering were prepared before the programme was cancelled after the Chernobyl accident. The specialisation of *Nuclear Energy* was started in 1999 as a branch of the *Thermal Engineering* second-cycle study programme. The independent second-cycle study programme *Nuclear Energy* was established in 2008.

According to the structure of the University, faculties are composed of departments, responsible for studies and research. The *Nuclear Energy* study programme is carried out at the Faculty of Mechanical Engineering and Design. *Nuclear Energy* is one among the four study programmes in the *Department of Thermal and Nuclear Energy* of this Faculty in the general field of Energy Engineering.

The Programme is designed to satisfy the broad educational needs of the nuclear energy sector. The needs and corresponding desirable specializations in this sector for Masters-level graduates is at present highly uncertain. These will depend upon the outcome of various political and commercial decisions, and this uncertainty is similar in a large number of countries. Plainly, these decisions are outside the control of the University, but the uncertainty is reflected in student recruitment.

The core-study programmes at KTU are similar to those of other leading European universities; specialisations differ.

In general, the SER is comprehensive and detailed. It gives a detailed description of the situation in the Programme, but provides relatively little “evaluation” (criticism, approval...). It tends often to show compliance with applicable Regulations rather than assess the quality or discuss the situation. Occasionally, the SER states that requirements are met without specifying numbers, etc.

The present report does not repeat or summarize information from the SER that is publicly available; comments are made here mainly if the Panel disagrees or does not fully understand certain statements or if weaknesses in the SER are detected.

As the Panel reviewed both the first- and second-cycle programmes in nuclear engineering at KTU and certain meetings were common for both programmes, the reader will find a number of identical or quasi-identical sections or statements in the two corresponding reports.

1.4. The site visit of the Review Panel

The Review Panel (or Panel) met with the Evaluation Coordinator and SKVC staff at the SKVC headquarters in Vilnius the morning of Monday, October 12 for an introductory meeting. In the afternoon of October 12 the Panel had an internal meeting to discuss the SERs and to prepare the forthcoming visits. At the end of the day, it moved to Kaunas.

On Tuesday and Thursday, the Panel visited the *Department of Thermal and Nuclear Engineering* to evaluate both the first and second cycle programmes in *Nuclear Engineering*. The Panel had meetings with senior management and faculty administration staff, the teaching staff, students, alumni, and employers and social partners. The schedule of the visits is given in the following subsection. At the end of each day, after a private Panel discussion, the Chair of the Panel summarized the first impressions to the university community.

Acknowledgments

The members of the Review Panel had during their visits and the various meetings professional, open and cordial discussions with the administrative and teaching staff. They are indebted to the Department for the hospitality extended to them and to SKVC and the Coordinator for the good organization of the evaluation.

List of meetings:

Note that meetings often involved discussion of both the Bachelor's and Master's 'Nuclear' programmes. For completeness a full list of meetings is given:

- Meeting with staff responsible for the preparation of the SERs (evaluation of the two study programmes – *Nuclear Energy*);
- Meeting with teaching staff (evaluation of the two study programmes – *Nuclear Energy*);
- Review of students' term and final papers (theses), examination material (evaluation of the two study programmes – *Nuclear Energy*);
- Meeting with students (evaluation of first cycle *Nuclear Energy* study programme);
- Meeting with students (evaluation of second cycle *Nuclear Energy* study programme);
- Meeting with alumni, employers and social partners (evaluation of the two study programmes – *Nuclear Energy*).

1.5. The Review Panel

The Review Panel was composed according to the *Description of the Review Team Member Recruitment*, approved by the Order No 1-01-151, 11/11/2011 of the Director of the Centre for Quality Assessment in Higher Education. The Panel comprised:

- | |
|---|
| <ol style="list-style-type: none">1. Prof. George Yadigaroglu (Chair of the Review Panel)
<i>Professor emeritus at ETH-Zurich, Switzerland.</i>2. Prof. Andres Siirde
<i>Professor at Tallinn University of Technology, Estonia.</i>3. Dr. Simon Walker
<i>Reader at Imperial College London, United Kingdom.</i>4. Dr. Rolandas Urbonas
<i>Deputy Director at Lithuanian Energy Institute, Lithuania.</i>5. Ms Julija Baniukevič
<i>Doctoral candidate of Physical Sciences at Vilnius University, Lithuania.</i> |
|---|

1.6. Students, and number of students

Those students to whom the Panel spoke were well satisfied with the Programme they had taken. They felt it had fitted them well for careers in the nuclear industry. The minority who had embarked on careers in *other* areas, namely thermal power, both felt that their nuclear studies had proven valuable in the careers they had followed.

Whilst the Review Panel understand the topic lies outside the Panel’s strict terms of reference for this Review, the Panel cannot fail to comment on student numbers. These, quoted from the SER, are:

Table 2.7 Students admitted to the Nuclear Energy programme

<i>Year</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>Total</i>
Admitted to the state financed places	4	6	6	7	2	25
Minimal score of competition	4.648	5.064	6.75	6.49	6.75	-
Maximal score of competition	6.408	7.208	7.52	9.28	9.71	-
Average score of competition	5.60	6.68	7.14	6.35	6.79	-

Further, during the site visit the Panel was told that numbers for 2015 showed no increase.

Numbers on the Programme have been low (at least since 2010, the furthest back for which the Panel was given information), and seem to have fallen sharply in very recent years. The Review Panel would say here that this is not in the Panel’s view in any sense the ‘fault’ of the Programme. However, it is something of which the Programme must take note.

It is the Panel’s understanding, which was confirmed forcibly by those ‘stakeholders’ to whom the Panel spoke, that there is a considerable need for Masters-level expertise in this area. This Programme is in principle well able to meet this need (subject to the significant staffing issues discussed below). However, there seems little enthusiasm on the part of potential students to take the Programme. Industrial representatives to whom the Panel spoke were aware of this, but felt that they themselves were unable to take actions to remedy or even improve matters. The Panel will return to this, and make a Recommendation, later.

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The SER states that “The study programme Nuclear Energy is aimed to provide comprehensive knowledge of nuclear energy engineering, develop abilities and practical skills to design and analyse engineering systems and processes of Nuclear Power Plants, implement and analyse radiation protection and waste management systems, decommissioning processes.” The programme aims and intended learning outcomes are publicly accessible on the KTU website: <http://ktu.edu/lt/programa/m/branduoline-energetika>.

The intended learning outcomes stated in the SER are rather vague and ill defined. They are far too general to be of any real benefit, although they are not ‘wrong’ as such. Some examples from the SER are: A1 and A2: “Has in-depth knowledge and understanding of the principles of nuclear engineering” and “Has critical awareness of the essence of nuclear engineering.” Both are rather circular and the difference between the two is hard to grasp, if any.

It is possible to infer detailed intended learning outcomes by inspection of the detailed *Contents* listings provided for individual study subjects. The intended learning outcomes so inferred are appropriate. However, the Panel would note that it found in a few cases the explicitly-stated intended learning outcomes of the individual study-subject descriptions to be poorly written and incoherent. Such an example can be found in the study subject *Two-Phase Flow Thermal Hydromechanics*: the first intended learning outcome deals with “close and approximate solutions of the boundary layer equations” (obviously in *single*-phase flow, why here?) and both intended learning outcomes three and five (in a total of five) deal with the critical heat flux and the boiling crisis (essentially the same thing).

The industrial and public needs in nuclear engineering in Lithuania have changed as the nuclear power plant was shut down and is in a decommissioning stage. There has been, however, discussion of a new nuclear plant. In this respect, the programme aims and intended learning outcomes are only partly based on the *future* professional requirements, public needs and needs of the labour market.

2.2. Curriculum design

The curriculum design meets legal requirements. The study programme consists of 120 ECTS, which is in compliance with the Order of the Minister of Education and Science of the Republic of Lithuania 03/06/2010 No V-826. The duration of studies is four semesters. Out of 120 ECTS of the

study programme 60 ECTS are for core subjects of the study field (should be at least 60 ECTS), 30 ECTS – elective subjects undertaken by the student (should be no more than 30 ECTS) and the final degree thesis contains 30 ECTS (should be no less than 30 ECTS).

The scope of the Programme is sufficient to ensure the achievement of the intended learning outcomes.

Study subjects are spread evenly with no more than five subjects taught 30 ECTS per semester.

There are naturally interactions between the study subjects, with common issues touched upon as is proper and scientifically appropriate, but their themes are not repetitive.

The content and methods of the study subjects are appropriate for the achievement of the intended learning outcomes.

The content of the subjects in the Programme is consistent with the type and level of the studies. Programme study subjects fit well with the specialisation, provides theoretical knowledge and practical skills necessary for the specialists in the current labour market.

The content of the Programme reflects the latest state of the art in the relevant area to an appropriate degree. However, the content of the Programme could be reviewed to increase the number of students to which it applies. It might be worth giving more prominence to topics such, as decommissioning, that are more definite regardless of political preferences.

2.3. Teaching staff

According to the Order of the Minister of Education and Science of the Republic of Lithuania 03/06/2010 No V-826 “No less than 80 % of the teaching staff shall have advanced degrees of which no less than 60 % shall engage in research in the same area as the subject they teach. If the study programme is oriented towards practical activities, up to 40 % of the staff teaching the main subjects may consist of persons with at least a three-year practical experience in the area of the applied subject they teach gained within the past seven years. Professional experience referred to above is a must for the teaching staff of applied subjects. No less than 20 % of the subjects in the main field of studies shall be taught by full professors”.

According to the SER, the Programme teaching staff (co-ordinators of the study subjects) consists of eight professors, four associate professors and one lecturer (academic position) – all of them with doctoral degrees (should be no less than 80 %). Scientific activities of all of

teachers correspond in general to the subjects taught (should be no less than 60 %). 62 % of the main subjects lectures (not including research projects and the final degree project that are coordinated by different supervisors) are taught by professors (should be no less than 20 %). 65.2 % of all subjects' lectures are taught by professors.

46 % of the Programme teachers are above 61 years old, including five out of eight professors (62.5 %). 69 % of teachers are over 50 years old and 75 % of professors, according to the SER.

The majority of study subject co-ordinators have one other teaching staff (lecturer or associate professor). In the vast majority of cases, senior subject co-ordinators have younger assisting teachers.

According to the SER, three new young teachers have started working at the Department of *Thermal and Nuclear Energy* since 2013. This Department is co-ordinating the study programme and has also five doctoral students. In the discussions with the teachers of the Programme it was found that only five teachers of the Department are accredited to have doctoral students, i.e. in the last five years have published three articles in journals referred to in the Thomson-Reuters WoS database. The SER group stated that soon the number of such teachers will reach ten, since a number of publications were submitted/accepted in journals. On the other hand, none of the Department staff (also taking into account age limitations) is currently eligible to participate in doctoral degree defence committees, where the requirement is to have in the last five years five articles published in journals referred to in the Thomson-Reuters WoS (with some additional detailed conditions). These observations show that a rather limited amount of research is performed. This limited number of international publications may jeopardise the intended renewal of teaching staff through the doctoral studies process as well as potentially slow down career development for the teachers. The Panel also noted that, according to the CVs of the Programme teaching staff presented, the research is performed not in all cases in the field of the subject taught, although this may be natural for basic study subjects. The Panel cannot easily evaluate the links as most papers are not in English.

Considering the formal facts summarized above, the Panel's opinion is given below.

The study programme is provided by a staff meeting legal requirements. Whilst their qualifications are adequate to ensure achievement of the intended learning outcomes, the Panel would have preferred to see a greater degree of research activity, in particular on the part of the more junior staff involved.

The staff with a ‘nuclear’ background is too small in numbers (two out of 13), and too dependent on a single individual of beyond normal retirement age, to represent a robust basis for the Programme.

A breadth and depth of expertise amongst the staff is educationally highly desirable, and this is just adequate at the moment. However, the position of the Programme is very vulnerable to any reduction in availability of a single individual. The Panel will return to this point.

There was no evidence that staff turnover is a problem. On the contrary, there was too interlinked a very small group of teachers delivering, in particular, the ‘nuclear’ parts of the Programme. This is obviously connected to the point above.

The Panel was satisfied that the University creates those conditions for the professional development of the teaching staff necessary for the provision of the Programme. These include traineeship, research, or work at foreign institutions or at industrial enterprises, courses, seminars, and other similar professional-development events.

The involvement of the teaching staff of the Programme in research directly related to the study programme being reviewed was noted above as being just adequate. It is as an area where the Panel would have preferred to see a much better position (second cycle studies). Besides a relatively weak showing by individuals, collectively the research involvement of the ‘nuclear’ staff is very narrow, reflecting the paucity of staff involved. There is a notable lack in crucial areas such as reactor physics.

2.4. Facilities and learning resources

The Review Panel, during their visit to the Department, found that the premises of the teaching facilities and laboratories are sufficient in size and quality to carry out the Programme. The premises were partly renovated, as mentioned in the SER, in 2014 and are well kept. The Review Panel visited five or six laboratories and one classroom.

The Panel did not see any specific laboratories meant for the *Nuclear* study programme. The SER states that the *Laboratory of Radiology and Radioprotection* in the Faculty of Mathematics and Natural Sciences, the *Laboratory of Problems of Nuclear Engineering* and the *Laboratory of Safety of Nuclear Installations* in the Lithuanian Energy Institute (hereafter, LEI) and some other scientific laboratories of LEI are used for the needs of the students of the *Nuclear Energy* study programme.

This kind of cooperation with the partners (LEI, Lithuanian Energy, Ignalina NPP, etc. is considered as strength in the SER and the Panel agrees with this approach.

The support of EU funds is expected to continue for the update of laboratories, in particular the *Laboratory of Thermal Engines* and *Laboratory of Nuclear Engineering*.

As mentioned in the SER, students have access to a large number of mathematical software suites such as MathCAD and Matlab, and, for engineering design projects, software like AutoDesk, AutoCAD, SolidWorks, etc. Also available are codes for the simulation of the thermal hydraulic and neutronic processes in reactors such as ATHLET, CUABOX-CUABBOX/NYCA; ASTEC etc. Some of these were visible during the visits to the laboratories.

In summary, the teaching and learning equipment (laboratory and computer equipment, consumables) are generally adequate both in size and quality, the SER notes, however, as “weaknesses” the following:

- Need to have some specialized laboratories: *Laboratory of Nuclear Engineering*, *Laboratory of Nuclear Safety Analysis*;
- There are still some laboratories at which facilities are not enough updated to the sufficient level. Some laboratories have no possibility demonstrating of the graphical material;
- There is still lack of the specialized software – computer programmes (codes) for the modelling and simulation of the thermal and hydro dynamical processes.

Students can use both the University and Faculty libraries. There is the ability to access a number of scientific databases (e.g. ScienceDirect, SpringerLINK, etc.).

Teaching materials (textbooks, books, periodical publications, databases) are adequate and accessible. The teachers of the *Nuclear Energy* study programmes (both cycles) have prepared seven textbooks and other teaching materials (including 13 e-materials) in the past five years. Additional learning book resources are being stored in the Department and are available on demand for the *Nuclear Energy* study programme students individually.

2.5. Study process and students’ performance assessment

The admission requirements are well-founded. The admission procedure is carried out by a faculty-level commission approved by the Rector on a competitive basis. Admission requires that

the applicants have graduated from a first-cycle university study programme in the technological or physical sciences and have no less than 18 ECTS on subjects of energy engineering.

The organisation of the study process ensures an adequate provision of the Programme and the achievement of the intended learning outcomes.

The situation regarding the number of students entering the Programme was already mentioned in the introductory section 1.6. The Programme had only two students entering in 2014 and 2015.

It is desirable that students are encouraged to participate in research, artistic and applied research activities. However, this was not demonstrated to the Panel. The Panel comments elsewhere on the desirability of greater involvement in relevant research by the staff teaching the Programme and this is anyway perhaps a pre-requisite for the involvement of students in this and particularly important for a second-cycle programme.

Students have opportunities to participate in student mobility programmes, but their actual involvement seemed rather limited. Given the very small numbers of students lately, the statistics are not meaningful. The faculty cannot of course enforce involvement, but perhaps greater encouragement towards it could be given.

The Panel concluded that there was an adequate level of academic and social support provided to students, largely based upon their generally positive responses to the Programme, and on the absence of any comments from them about a lack in this regard.

The assessment system of students' performance is clear, adequate and publicly available on the KTU website, although the processes and quality assurance associated with the setting of examination papers was not of the standard comparable to best practice in some other higher education institutions, in particular in the UK.

The professional activities of the majority of graduates meet the programme providers' expectations.

2.6. Programme management

According to the SER, the management of the Programme is carried out in accordance with the Statute of KTU approved by decision Nr. XI-1194 of 30 October 2010 of the Chairman of the Parliament and the "Temporal Academic Regulamin" of KTU. The study programme

administration and quality assurance are managed by the Vice-Rector for Studies with the help of the Department of Academic Affairs. The Programme is constantly improved and updated by the Study Programme Committee – a unit approved by order Nr. A-124 of 4 March 2014 of the Rector and acting in accordance with its regulations. Members of the Study Programme Committee include four professors, three representatives of employers and three representatives of students. In the conduct of the Programme and its quality assurance, the Committee cooperates with the Senate Studies and Academic Culture Committee and the Departmental Coordinator of the Programme.

Changes in the Programme are discussed and approved by the Faculty Council. The Faculty Council consists of 15 members. Stakeholders participate in such activities: three students are delegated by the Faculty Student Union, there is one representative of employers, the Faculty Dean, and representatives of the Faculty staff. The Study Programme Committee presents its proposals which are agreed with the Faculty Council to the Department of Academic Affairs which summarizes propositions and presents them for approval to the Rector's Office and the University Senate.

The Study Programme Committee certifies study subjects (together with the Department), makes plans and appoints reviewers for assessment of prepared methodological and educational material and takes into account their assessment and recommendations in designating the status of a manuscript, or educational book, or makes offers to the Senate Studies and Academic Culture Committee to designate the status of a textbook.

The proper conduct of the Programme and its improvements are ensured by the Programme Manager, an Associated Professor of the Department. The quality of the study subjects is assured by the teachers or coordinators of the subjects.

The process of the Programme administration and its quality assurance are available in the University Academic Information System.

The Panel concludes that in general the management of the Programme seems appropriate in spite of the fact that the internal quality assurance measures for the Programme, as described in the SER as effective and efficient, seem to rely mainly on bureaucratic measures and may be missing in-depth academic-quality assessments of the subjects, teachers and teaching methods.

III. RECOMMENDATIONS

1. The Panel recommends that the intended learning outcomes of the Programme, including the study subjects' intended learning outcomes be rewritten to be more concrete, consistent and useful.
2. As discussed above, staffing is very 'non-robust' and thin. If the Programme is to continue this must be remedied. There are items to be addressed:
 - the excessive dependence on a single post-retirement individual;
 - the low level of research activity of the other staff;
 - the inadequate coverage in the staff's research of the subject matter of the Programme.
3. The content of the Programme needs to be reviewed to hopefully increase the number of students to which it applies. It might be worth giving more prominence to topics such as decommissioning, that are more definite regardless of political preferences.
4. The participation of students in research, artistic and applied research activities should be further encouraged and enhanced.
5. The Panel recommends a greater degree of research activity, in particular on the part of the more junior staff involved and coverage of certain areas such as reactor physics where research seems to be missing altogether.

IV. EXAMPLES OF EXCELLENCE

The Panel felt this was a good Programme, well executed, but did not identify any specific areas of excellence.

V. SUMMARY

The Self-evaluation Report is complete and detailed. It shows that the teaching staff are aware of certain weaknesses and limitations and tries to find solutions. The SER has a rather formal and bureaucratic attitude in showing compliance with a multitude of national regulations and provides a limited evaluation of the academic quality of the Programme, of the teaching staff and of the subjects.

The Department hosting this Programme has a structure and operates in ways similar to those of other European institutions of higher learning. The Programme is formally also similar in content and structure to those of other European universities.

The Programme meets the regulatory requirements.

The aims and intended learning outcomes of the Programme (including study subjects intended learning outcomes) are not inappropriate as such, but are poorly written. The industrial and public needs in nuclear engineering in Lithuania have changed recently. In this respect, the programme aims and intended learning outcomes are only partly based on the *future* professional requirements, public needs and needs of the labour market.

Staffing is very thin, and needs to be made much more robust if the Programme is to continue.

A more research-active staff is needed for the core nuclear study subjects, in particular for this second-cycle programme.

Facilities and resources are appropriate.

The study process and the assessment of the students' performance is generally appropriate. Programme management is appropriate as well.

A very striking feature of the Programme is that it has few students taking it. This is not the fault of the Programme, but presumably largely reflects economic and policy issues in Lithuania. Number of students is not a criterion of the Panel's evaluation, and it has not influenced the Panel's conclusions, but the Panel do urge that the topic be addressed urgently. The Review Panel has made above the suggestion that consideration should be given to broadening the subject matter to cover areas where there is a more guaranteed need for graduates, such as decommissioning.

VI. GENERAL ASSESSMENT

The study programme *Nuclear Energy* (state code – 621E32001) at Kaunas University of Technology is given a positive evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation of an area in points*
1.	Programme aims and learning outcomes	2
2.	Curriculum design	3
3.	Teaching staff	2
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	3
6.	Programme management	3
	Total:	16

*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.

Grupės vadovas: Team leader:	Prof. George Yadigaroglu
Grupės nariai: Team members:	Prof. Andres Siirde
	Dr. Simon Walker
	Dr. Rolandas Urbonas
	Ms Julija Baniukevič

**KAUNO TECHNOLOGIJOS UNIVERSITETO ANTROSIOS PAKOPOS STUDIJŲ
PROGRAMOS *BRANDUOLINĖ ENERGETIKA* (VALSTYBINIS KODAS – 621E32001)
2016-01-29 EKSPERTINIO VERTINIMO IŠVADŲ
NR. SV4-48 IŠRAŠAS**

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa *Branduolinė energetika* (valstybinis kodas – 621E32001) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	2
2.	Programos sandara	3
3.	Personalas	2
4.	Materialieji ištekliai	3
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	3
	Iš viso:	16

* 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)

<...>

IV. SANTRAUKA

Savianalizės suvestinė (toliau – SS) apima reikiamus aspektus ir yra išsami. Joje atsispindi, kad akademinis personalas žino tam tikras programos silpnybes ir apribojimus bei bando rasti tinkamus sprendimus. Kita vertus, SS yra daugiau formalus ir biurokratinio pobūdžio, parengta orientuojantis į atitiktį šalies teisės aktų reikalavimams, tuo pačiu joje yra pateikiamas ribotas programos kokybės, akademinio personalo ir studijų dalykų vertinimas.

Studijų programą vykdančios katedros struktūra ir veikimo principai yra panašūs kaip ir kitose Europos aukštojo mokslo institucijose, kurioms būdingas aukšto lygio specialistų rengimas. Formaliai studijų programa savo turiniu ir sandara taip pat yra panaši į kitų Europos universitetų.

Programa atitinka teisės aktų reikalavimus.

Studijų programos tikslai ir numatomi studijų rezultatai (įskaitant ir studijų dalykų numatomus studijų rezultatus) iš esmės nėra netinkami, tačiau yra prastai suformuluoti. Pastaruoju metu Lietuvoje pramonės ir visuomenės poreikiai branduolinėje energetikoje pasikeitė. Atitinkamai studijų programos tikslai ir numatomi studijų rezultatai tik iš dalies yra pagrįsti ateities profesiniais reikalavimais, visuomenės ir darbo rinkos poreikiais.

Programos akademinis personalas yra itin menkas, jis turėtų būti žymiai „tvirtesnis“, kad programą būtų galima ir toliau vykdyti.

Atsižvelgiant į tai, kad tai yra antrosios pakopos studijų programa, dėstytojais turėtų aktyviau dalyvauti mokslo tiriamojoje veikloje, susijusioje su esminiais branduolinės energetikos studijų dalykais.

Materialieji ištekliai, skirti studijų programos vykdymui, yra tinkami.

Studijų eiga ir studentų pasiekimų vertinimas yra tinkamas. Programos vadyba veikia efektyviai.

Stebina tai, kad itin mažai studentų renkasi šią studijų programą. Tai nėra netinkamos studijų programos kokybės problema, tačiau, veikiausiai, atspindi ekonomikos ir politikos problemas Lietuvoje. Studentų skaičius nėra šio vertinimo kriterijus ir jis nedarė įtakos ekspertų išvadoms, tačiau ekspertų grupė rekomenduoja šį klausimą spręsti nedelsiant. Ekspertų grupė aukščiau pateikė siūlymą išplėsti studijų objektą ir apimti sritis, kurios labiau garantuoja absolventų paklausą, pavyzdžiui, atominės elektrinės uždarymas.

<...>

IV. IŠSKIRTINĖS KOKYBĖS PAVYZDŽIAI

Ekspertų grupės manymu, tai yra gera studijų programa, tinkamai vykdoma, tačiau konkrečių gerosios patirties pavyzdžių vertinimo metu nustatyta nebuvo.

<...>

III. REKOMENDACIJOS

1. Ekspertų grupė rekomenduoja performuluoti studijų programos, taip pat studijų dalykų numatomus studijų rezultatus, kad jie būtų konkretesni, nuoseklesni ir naudingesni.

2. Kaip jau buvo paminėta anksčiau, personalas labai „netvirtas“ ir menkas. Jeigu studijų programa bus vykdoma toliau, ši probleminį klausimą reikia spręsti. Atitinkamai turi būti atsižvelgiama į šiuos dalykus:
 - pernelyg didelė priklausomybė nuo vieno jau į pensiją išėjusio asmens;
 - nedidelis kitų dėstytojų įsitraukimas į mokslo tiriamąją veiklą;
 - nepakankama dėstytojų mokslo tiriamoji veikla atsižvelgiant į studijų objektą.
3. Peržiūrėti studijų programos turinį, siekiant didinti, studentų, besirenkančių šią programą, skaičių. Veikiausiai, vertėtų daugiau dėmesio skirti tokioms temoms, kaip atominės elektrinės uždarymas, kurios yra labiau nepriklausomos nuo būsimų politinių sprendimų.
4. Skatinti ir remti studentų dalyvavimą mokslo tiriamojoje, įskaitant taikomąją, ir meninėje veikloje.
5. Ekspertų grupė rekomenduoja užtikrinti aktyvesnę akademinio personalo mokslo tiriamąją veiklą, ypač jaunesniųjų dėstytojų, bei apimti tam tikras sritis, pavyzdžiui, reaktorių fiziką, kurios apskritai nėra plėtojamos.

<...>

Paslaugos teikėjas patvirtina, jog yra susipažinęs su Lietuvos Respublikos baudžiamojo kodekso 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

Vertėjos rekvizitai (vardas, pavardė, parašas)