



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO
STUDIJŲ PROGRAMOS *BRANDUOLINĖ ENERGETIKA*
(valstybinis kodas – 612E32001)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF NUCLEAR ENERGY (*state code – 612E32001*)
STUDY PROGRAMME
at KAUNAS UNIVERSITY OF TECHNOLOGY

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Išvados parengtos anglų kalba
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Vilnius
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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Branduolinė energetika</i>
Valstybinis kodas	612E32001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Energijos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	Nuolatinė (4 metai), iššęstinė (6 metai)
Studijų programos apimtis kreditais	240 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Branduolinės energijos inžinerijos bakalauras
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	612E32001
Study area	Technological Sciences
Study field	Energy Engineering
Type of the study programme	University studies
Study cycle	First
Study mode (length in years)	Full-time studies (4 years), part-time studies (6 years)
Volume of the study programme in credits	240 ECTS
Degree and (or) professional qualifications awarded	Bachelor 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 HEI/Faculty/Study field/Additional information

The mission of Kaunas University of Technology is defined in a way similar to those of other European leading universities. The Self Evaluation Report (hereafter, 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 engineers for the nuclear energy sector in Lithuania began in 1975 at Kaunas Polytechnic Institute, (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 Power Engineering was started in 1993 as a branch of the *Thermal Engineering* study programme. Later the independent first cycle study programme *Nuclear Energy* was established in 2008.

The *Nuclear Engineering* study programme is carried out at the Faculty of Mechanical Engineering and Design. The *Department of Thermal and Nuclear Energy* of this Faculty is responsible for four university study programmes in the study field of Energy Engineering.

The programme is designed to satisfy the broad educational needs of the nuclear energy sector. The need of this sector for new graduates is at present highly uncertain. The need 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 HEIs, 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 publicly available from the SER; comments are made here 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 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.

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 generally 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:

<p>1. Prof. George Yadigaroglu (Chair of the Review Panel) <i>Professor emeritus at ETH-Zürich, Switzerland.</i></p> <p>2. Prof. Andres Siirde <i>Professor at Tallinn University of Technology, Estonia.</i></p> <p>3. Dr. Simon Walker <i>Reader at Imperial College London, United Kingdom.</i></p> <p>4. Dr. Rolandas Urbonas <i>Deputy Director at Lithuanian Energy Institute, Lithuania.</i></p> <p>5. Ms Julija Baniukevič <i>Doctoral candidate of Physical Sciences at Vilnius University, Lithuania.</i></p>
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1.6. *Students, and numbers 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, felt their nuclear studies had proven valuable in the careers they had followed.

Whilst the Panel understands that the topic lies outside the 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>
<i>Admitted to the state financed places</i>	<i>8</i>	<i>9</i>	<i>8</i>	<i>2</i>	<i>0</i>	<i>27</i>
<i>Admitted to the self-financed places</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>1</i>

The Panel during the site visit was further informed orally that numbers for 2015 were zero also.

Plainly, there has been a catastrophic fall in numbers. For completeness, the Panel would say here that this is not in the Review 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 own understanding, which was confirmed forcibly by those 'stakeholders' to whom the Panel spoke, that there is a considerable need for Bachelors-level nuclear engineering 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 university undergraduate entrants 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 Review 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 engineering, develop abilities and practical skills to design and implement engineering systems and processes of Nuclear Power Plants, implement radiation protection and waste management systems.” The programme aims and intended learning outcomes are publicly accessible on the KTU website: <http://ktu.edu/lt/programa/b/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. Examples are (from Table 2.1 of the SER): A1: “Knows and understands scientific and mathematical principles underlying thermal engineering” (a circular definition, moreover, why *thermal* engineering is set as top-level, first outcome and nuclear engineering in A3, the third place? Also, there are no *mathematical* principles, but possibly principles expressed in mathematical form); A6 “Has coherent knowledge of nuclear engineering including key knowledge of nuclear engineering area” (again fully circular definition and what is the difference between *nuclear engineering* and the *nuclear engineering area*?); etc.

It is possible, however, 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 the actual stated ‘Outcomes’ in these individual study subject descriptions to be poorly written and incoherent in many cases, one example among many others can be found in the study subject *Theory of Nuclear Reactors* where the main aim is “To obtain the knowledge about the peculiarities of transient processes in nuclear reactor; familiarize with reactor design and calculation; to obtain knowledge in nuclear reactors safety.” (Why the transient processes only?) The following four intended learning outcomes are rather vague and the *Syllabus* of the study subject does not even mention reactor kinetics, one of the main “transient peculiarities.”

The industrial and public needs in nuclear engineering in Lithuania have changed as the existing 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 240 ECTS, which is in compliance with the Order of the Minister for Education and Science of the Republic of Lithuania 09/04/2010 No V-501. The duration of full-time studies is four years, and part-time studies – six years. Of 240 ECTS of the study programme, 165 ECTS are for special subjects in the study field (should be no less than 165 ECTS), 15 ECTS are for general university study subjects (should be no less than 15 ECTS) and 45 ECTS are for subjects elected by the student (should be no more than 60 ECTS) and 15 ECTS are for the practices (should be at least 15 ECTS). The final degree thesis contains 15 ECTS (should be at least 12 ECTS). The number of subjects taught per semester shall not be more than seven according to the regulations. For the Programme the maximum taught number of subjects is six.

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

Study subjects are spread evenly for full-time and part-time studies, as 30 ECTS/semester and 15 to 30 ECTS/semester respectively.

The content of the subjects in the Programme is consistent with the type and level of the studies. The Programme study subjects fit well with the specialisation, provide theoretical knowledge and practical skills necessary for some of the specialists in the current and near-future labour market. However, they do not address future needs related to nuclear waste management and decommissioning.

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 inferred learning outcomes.

The content of the programme reflects the latest state of the art in the relevant area to an appropriate degree.

2.3. Teaching staff

According to the Order of the Minister for Education and Science of the Republic of Lithuania 09/04/2010 No V-501 “at least half of the subjects in the study field must be taught by scientists

or scholars”. According to the SER, the Programme teaching staff (co-ordinators of the study subjects) consists of 11 professors, 19 associate professors and four lecturers (academic position). In the Programme all but two subjects of one of the specialisations are taught by scientists (i.e. persons having a doctoral degree). Therefore, the study programme is provided by a staff meeting legal requirements.

According to the SER, 44 % of the Programme teachers are above 61 years old, including seven out of eleven professors (over 63 %). Some of 70 % of teachers (and 100 % of professors) are above 50 years old according to the SER.

All core subjects’ co-ordinators have one to three other teaching staff (doctoral student, lecturer or associate professor). In core selective subjects all but three subject co-ordinating teachers have other teaching staff. In the vast majority cases senior subject co-ordinators have younger assisting teachers.

According to the SER, since 2009 two new teachers have been involved in the Programme. The *Department of Thermal and Nuclear Energy*, which is co-ordinating the study programme, has five doctoral students. In the discussions with the teachers of the Programme it was found that only five teachers of the *Department of Thermal and Nuclear Energy* are accredited to have doctoral students, i.e. in last five years have published three articles in journals referred in Thomson-Reuters WoS database. The SER authors’ group stated that rather soon the number of such teachers will reach ten, since a number of publications have been 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 in the Thomson-Reuters WoS (with some additional detailed conditions).

These observations show that a rather limited amount of research is performed, as also shown by the number of publications. The limited number of international publications may jeopardise the intended renewal of teaching staff through the doctoral studies process and 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 necessarily in the field of the subject taught. One *example among many others*, can be found in the teacher’s CV who is teaching Physics and Engineering of Nuclear Reactors, Management of Spent Nuclear Fuel and Radioactive Waste, and Decommissioning Technology of Nuclear Power Plant and has a single

publication listed on rather classical heat transfer in multiphase flow. Several other teachers have no English language publications that could be evaluated.

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

Whilst the qualifications of the staff 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 number, only two persons are teaching the core "nuclear courses" out of the 12 involved in the Programme and too dependent on a single individual (included in the two just mentioned) 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 Review Panel was satisfied that the higher education institution 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 better position. 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 laboratories visited are used also by other programmes in the Faculty of Mechanical Engineering. This is understandable as the basic study programme is common and has a strong mechanical engineering aspect. For instance, the *Machine Elements Educational Laboratory* and the *Laboratory of Strength of Materials* has new modern equipment from a commercial company normally used for a range of training, ranging from vocational to university level.

There were also laboratories that were not updated with new equipment and the SER mentions this as a weakness: “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.”

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 a 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.

The Panel learned that there is a sufficient number of companies that can provide professional practice places. The practical-training places are either individually found or suggested by the Department.

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.). In some study subjects the Panel

found mentioned a very limited number of reference books at the library and those books are in English.

2.5. Study process and students' performance assessment

The admission requirements are those of the Lithuanian system with a threshold of two; they are well-founded.

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 no students at all in 2014 and 2015.

The *Nuclear Energy* programme was started in 2008, while previously nuclear engineering study subjects were offered as specialisation inside the *Thermal Energy and Technologies* programme. Selection of specialisation was in the fourth semester of that programme. The Panel recommends reconsidering this alternative. It could be practical and beneficial to all parties concerned.

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 comment elsewhere on the desirability of greater involvement in relevant research by the staff teaching Programme and this is anyway perhaps a pre-requisite for the involvement of students in this.

Students have opportunities to participate in student mobility programmes, but their actual involvement seemed rather limited. 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 higher education institutions in other countries and in particular in the UK.

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

2.6. Programme management

In general Programme management seemed appropriate. In particular: responsibilities for decisions and monitoring of the implementation of the Programme are clearly allocated. 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 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 for Electrical and Electronical Engineering, Environmental Engineering and Energy Engineering Study Programmes. Members of the Study Programme Committee include three professors, three representatives of employers and three representatives of students. There is a designated Manager of the study programme who carries responsibility for the content and quality.

According to the SER, the responsibilities for decisions and monitoring of the implementation of the Programme are clearly allocated and information and data on its implementation are regularly collected and analysed.

The outcomes of internal evaluation of the Programme are used for the improvement of the Programme. Constant quality assessment of the Programme is carried out in compliance with KTU Guide of Quality. The Study Programme Committee mentioned above cooperates with the Senate Studies and Academic Culture Committee and the Department via the Co-ordinator of the Programme and takes into account their proposals in decisions regarding renewal of the Programme or study subjects and preparation of new ones. Changes of the Programme are discussed and approved by the Faculty Council consisting 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. It appoints reviewers for assessment of the prepared methodological and educational materials and makes recommendations regarding their status.

The proper conduct of the Programme and its improvements are ensured by the Programme Manager – a professor of the *Department of Thermal and Nuclear Energy*. The quality of study subjects is assured by the teachers/coordinators of these subjects.

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

There are systematic student evaluations of the subjects and teachers for all subjects, but the Department is not satisfied with the low response rate.

The Panel recommends that ways be found to increase the participation in the subjects' evaluations by the students. It also recommends that the (anonymous) evaluation results be presented to the class by the teacher and discussed.

The evaluation and improvement of the Programme processes involve stakeholders, and indeed more generally the close connections that evidently exist between the Faculty and the relevant local industry are notable and good. For example, the problem of very low or inexistent numbers of entering students is addressed cooperatively with industry; employers take active part in the event "Career days" organized by KTU; the study process is continuously improved in cooperation with the energy and industrial companies, scientific research centres, professional associations and foreign partners; etc.

The internal quality assurance measures for the Programme are described in the SER as effective and efficient. They seem, however, 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 and consistent.
2. It is desirable that students are encouraged to participate in research, artistic and applied research activities.
3. The Panel recommends that ways be found to increase the participation in the subjects' evaluations by the students. It also recommends that the (anonymous) evaluation results be presented to the class by the teacher and discussed.
4. As discussed above, staffing is very 'non-robust' and thin. If the Programme is to continue this must be remedied. There need 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;
 - a breadth and depth of expertise amongst the staff is educationally highly desirable, and this is just adequate at the moment.
5. Given the low student numbers (with the last two intakes being actually zero), the Panel recommend the institution consider carefully if a separate Programme is really the best way to meet the need of the nuclear industry for such expertise.

At least in the interim, whilst national policies are being developed, a strong set of optional nuclear study subjects embedded within the *Thermal Engineering* programme is an option the Panel would urge to investigate carefully.

If this approach is adopted, the Panel would urge that staffing be maintained at a level and mix of expertise such that a stand-alone Programme remains an option for future re-adoption.

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, but provides only a limited evaluation of the academic quality of the Programme, of the teaching staff and of the study 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 and not always consistent.

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.

Facilities and resources are appropriate.

The study process and the assessment of the students' performance is appropriate.

Programme management is appropriate.

A very striking feature of the Programme is that it has essentially no 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 for the evaluation, and it has not influenced the Panel's conclusions, but the Panel do urge that the topic should be addressed urgently. One partial response to this would be to abandon the distinct '*Nuclear*' Bachelor's programme, and to offer similar content in the form of specialisation study subjects within the *Thermal Energy and Technology* programme.

VI. GENERAL ASSESSMENT

The study programme *Nuclear Energy* (state code – 612E32001) 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 PIRMOSIOS PAKOPOS STUDIJŲ
PROGRAMOS *BRANDUOLINĖ ENERGETIKA* (VALSTYBINIS KODAS – 612E32001)
2016-01-29 EKSPERTINIO VERTINIMO IŠVADŲ
NR. SV4-47 IŠRAŠAS**

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa *Branduolinė energetika* (valstybinis kodas – 612E32001) 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 išteklių	3
5.	Studijų eiga ir jos vertinimas	3
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* 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 formalaus 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 ir ne visada nuoseklūs.

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

Dėstytojai turėtų aktyviau dalyvauti mokslo tiriamojoje veikloje, ypatingai 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. Vienas iš galimų variantų – atsisakyti atskiros bakalauro studijų programos *Branduolinė energetika*, o pasiūlyti panašaus turinio specializaciją vykdomoje studijų programoje *Šilumos energetika ir technologijos*.

<...>

IV. IŠSKIRTINĖS KOKYBĖS PAVYZDŽIAI

Ekspertų grupė 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 ir studijų dalykų, numatomus studijų rezultatus, kad jie būtų aiškesni ir nuoseklesni.
2. Skatinti studentus dalyvauti mokslo tiriamojoje, įskaitant taikomąją, ir meninėje veikloje.

3. Ekspertų grupė rekomenduoja ieškoti būdų, kaip padidinti studentų dalyvavimą vertinant studijų dalykus. Taip pat rekomenduojama, kad dėstytojas pristatytų (anoniminio) vertinimo rezultatus studentams ir juos aptartų.
4. 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;
 - akademinio personalo žinios turėtų būti daugiau apimančios ir gilesnės, nes šiuo metu jų vos pakanka programos tikslų ir numatomų studijų rezultatų pasiekimui.
5. Atsižvelgiant į nedidelį studentų skaičių (pažymėtina, kad per paskutinius dvejus metus skaičius buvo lygus nuliui), ekspertų grupė rekomenduoja universitetui apsvarstyti, ar atskira studijų programa iš tiesų yra pats geriausias būdas patenkinti branduolinės energetikos sektoriaus poreikius.

Bent jau tarpiniu laikotarpiu, kol šalies energetikos politika dar formuojama, ekspertų grupė skatina išnagrinėti galimybę ir svarbią dalį branduolinės energetikos studijų dalykų, kaip pasirenkamųjų, integruoti į *Šilumos energetikos ir technologijų* studijų programą.

Jeigu šis siūlymas būtų įgyvendintas, ekspertų grupė rekomenduoja išlaikyti personalo žinių ir patirties lygį bei įvairovę. Tai yra svarbu, jeigu ateityje būtų nuspręsta vėl vykdyti atskirą studijų programą.

<...>

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)