



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus Gedimino technikos universiteto
**STUDIJŲ PROGRAMOS *ENERGIJOS INŽINERIJA IR
PLANAVIMAS* (valstybinis kodas – 621E30003)**
VERTINIMO IŠVADOS

EVALUATION REPORT
**OF *ENERGY ENGINEERING AND PLANNING* (state code –
621E30003)**
STUDY PROGRAMME
At Vilnius Gediminas Technical University

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Energijos inžinerija ir planavimas</i>
Valstybinis kodas	621E30003
Studijų sritis	Technologijos mokslai
Studijų kryptis	Energijos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinė (2 metai)
Studijų programos apimtis kreditais	120 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Energijos inžinerijos magistras
Studijų programos įregistravimo data	Lietuvos Respublikos švietimo ir mokslo ministro 2007 m. vasario 19 d. įsakymu Nr. ISAK-225.

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Energy Engineering and Planning</i>
State code	621E30003
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)
Volume of the study programme in credits	120 ECTS
Degree and (or) professional qualifications awarded	Master of Energy Engineering
Date of registration of the study programme	19 th February 2007, under the Order of the Minister of the Ministry for Education and Science of the Republic of Lithuania No. ISAK-225.

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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 the 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 to constantly improve their study programmes and to inform the public about the quality of studies.

The evaluation process consists of the main following 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 at 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 external evaluation SKVC takes a decision to accredit the study programme either for 6 years or for 3 years. If evaluation of the programme is negative such programme is not accredited.

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 document has been provided by the HEI after the site-visit:

No.	Name of the document
1.	The second cycle study programme of Energy Engineering and Planning: study field subjects, conducted by professors

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

Vilnius Gediminas Technical University (hereafter, VGTU) is a state higher education institution, established by Seimas of the Republic of Lithuania. The Self Evaluation Report (hereafter, the SER) states “*VGTU is one of the largest higher education institutions in Lithuania and strives to become the leader in technology and engineering studies in the Baltic States. The aim of Vilnius Gediminas Technical University is to educate highly trained, creative and socially active specialists, who would be able to successfully perform in Lithuanian and foreign labour and research markets*”, and that “*The most important scientific study and research division is the department. The department shall independently solve any research and studies-related tasks set by the University and the Faculty*”. There are ten faculties at the University overseen by a management structure reporting to the Rector who is assisted by four Vice-Rectors and the Chancellor. The Rector is in charge for the University activities and performance results. The management collegial bodies, the Council and the Senate, appoint and oversee the work of the Rector who formulates the University’s vision and strategic plan. The Council is responsible for securing support for the University and approving the budget and other financial and strategic activities. The Senate is a collegiate body formed from the University staff and oversees implementation of the study programmes. The management structure of the University is similar to that in most European universities.

The *Faculty of Environmental Engineering* comprises seven departments and four scientific divisions. The second cycle programme in *Energy Engineering and Planning*, considered in this report, is carried out by the *Department of Building Energetics* within the Faculty. The programme was reviewed in 2009 and was accredited until August 2015.

The programme is designed to serve the needs of the labour market in Lithuania in the energy demand sector, with particular emphasis on building energy demand. The Panel were able to find out that there is a need for graduates in this field, which was demonstrated by engagement of students in jobs related to their field of study while performing their studies and staying in the sector after graduation.

In general, the SER is comprehensive and detailed. It gives a detailed description of the University structure and the programme, but provides relatively little critical “evaluation”. It tends to often show compliance with legal requirements and University regulations rather than assess the quality or discuss the situation. Occasionally, the SER states that requirements are met

without specifying evidence. The SER also attempts to show that the recommendations from the previous external evaluation were addressed.

The present report does not repeat or summarise publicly available information available from the SER; comments are made here if the Panel disagree or do not fully understand certain statements or if weaknesses of the SER are detected.

In addition to the second cycle programme in *Energy Engineering and Planning* discussed in this report, the Panel has reviewed two other programmes carried out at the same Department; the second cycle programme in *Thermal Engineering* and the first cycle programme in *Building Energetics*. Certain meetings were common for the three programmes and thus the reader will find a number of identical or quasi-identical sections in the three corresponding reports.

1.4. 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 visit to the HEI was conducted by the Panel on 1-2/12/2015.

1. Prof. Abdalnaser I. Sayma (Chair of the Team)

Professor of Energy Engineering, and Associate Dean for Postgraduate Studies at the School of Mathematics, Computer Science and Engineering, City University London, United Kingdom.

2. Prof. Zbigniew Hanzelka

Director of the Department of Power Electronics and Energy Control Systems at the AGH University of Science and Technology, Poland.

3. Prof. Frank Behrendt

Professor for Energy Process Engineering and Conversion Technologies for Renewable Energies at Berlin Institute of Technology (TU Berlin), Germany.

4. Dr Thomas Flower

Dean of Faculty at the UAS Hamburg, Faculty for Engineering and Computer Sciences, Germany.

5. Dr Ramūnas Gatautis

Research Associate at Lithuanian Energy Institute, Lithuania.

6. Mr Giedrius Gecevičius

Doctorate Candidate (Energy and Power Engineering) at Lithuanian Energy Institute, Lithuania.

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The aims of the programme are clearly defined and publicly available in English on the University's web site (<https://medeine.vgtu.lt/programos/>): to educate professionals who, after they have acquired knowledge while studying the Bachelor's and Master's subjects, can analyse, plan and simulate the technical systems, investigate the energy supply and energy consumption of systems, their equipment and processes, are able to apply scientific and technological innovations in designing, planning, installing, operating and maintaining of systems, which exhibit high efficiency, cost effectiveness, quality and reliability of energy conversion, and optimise energy consumption and management in the light of sustainable demand for resources and the environmental impact.

The intended learning outcomes are presented in terms of knowledge and its application, research skills and special abilities. The Review Panel noticed that programme's intended learning outcomes are too general and mostly of generic nature. For example, they include "Knowledge on scientific methods and analysis tools applied in energy engineering". The Panel's view is that this kind of statements is not helpful to students on the programme or prospective students and it needs to be cast in a more specific way clarifying the knowledge and scientific methods pertinent to the particular areas of energy engineering addressed in the programme and what applications they can be used for. **The syllabus seems to have strong focus on building energy and therein primarily on heat supply. The Panel feels that this should be clearly reflected in the formulation of the intended learning outcomes.** It is also the Panel's opinion that **the title of the programme does not either reflect this main focus** although it has compatibility of the presented intended learning outcomes as opposed to the actual aims and the intended learning outcomes.

From discussions with the programme team, it became apparent to the Panel that regulations by the University enforce this general presentation of the intended learning outcomes. This could be verified by observing that other programmes on the University's web site had almost the same pattern of presentation of the intended learning outcomes. Annex 2.2 of the SER expresses a relationship between the study subject and the programme's intended learning outcomes, but this does provide added value in making these outcomes more specific to this programme. However, it is the view of the Panel that the programme team should make more efforts to either provide more specific intended learning outcomes within the framework specified by the University or

demand flexibility in the Universities framework to enable casting the intended learning outcomes in a more specific manner.

The content of the programme, though not clearly reflected in the intended learning outcomes, is consistent to a large degree with the level of study and the qualification offered. Assurance to this notion could be found in the more specific intended learning outcomes of the individual study subjects. The Panel was able to verify from the interviewed alumni and social partners that the programme content have strong link to professional requirements, public needs and the needs of the labour market in Lithuania. This was reflected from the significant degree of engagement from industry with the programme and the availability of employment opportunities to students graduating from the programme and in many cases, students working in related fields while still studying.

The primary focus of the programme is in energy engineering and planning in relation to energy demand for buildings while the programme's name *Energy Engineering and Planning* may imply a wider scope that could include for example energy supply as well as demand. **Thus it is recommended that the programme name should be changed to reflect more closely the specific focus of the syllabus on building energy demand.**

2.2. Curriculum design

The programme is made of two specialisations, *Energy Planning* and *Energy Engineering*. The legal requirements as set out in the Order of the Minister for Education and Science of the Republic of Lithuania "General Requirements for Master Degree Study Programmes" (3 June 2010 No V-826) are fully met. The programme comprises 120 ECTS of which 61 ECTS in the field of study. There are 21 ECTS of elective subjects and the final thesis amounts to 39 ECTS. The programme is delivered in full-time mode over four semesters spanning two academic years with 30 ECTS delivered in each semester. The final semester is devoted to completing the thesis. The study subjects of the field are at the right level in terms of problem solving and the scientific innovation in comparison with the first level of studies. The University clearly indicates that the study field that the students are accepted to and the list and content of supplementary subjects are available in the programme. The maximum number of subjects studied in each semester does not exceed five. The independent work amounts to 76.1 % of the overall study time, although this is not broken down to subject by subject in the report, it should exceed 30 % per subject required by the legal acts. Generally, the titles of the final theses provided in Annex 5.1 of the SER indicate analytical topics based on a mixture of independent scientific and applied research.

However, the Panel were not able to assess the quality of the sample of theses provided during the visit, as they were not written in English. The assessment process of the theses is consistent with Masters' studies requirements, where a defence board is appointed which includes the academic supervisors and reviewers. The final theses submission and defence dates are announced at least one month before the defence according to the SER.

The specialist study subjects are distributed across the three teaching terms; however, the first two terms have significantly more specialist subjects than the third term. The compulsory subjects of Thermodynamic Analysis (5 ECTS), Life Cycle Analysis (5 ECTS) and Energy Economics (5 ECTS) in addition to the selection of optional subjects of Finite Elements in Thermomechanics, Theory and Methods of Optimisation in term I. The compulsory subjects of Building Thermal Regime (7 ECTS), Process and System Integration (6 ECTS) and Energy Efficiency of Buildings (6 ECTS) in addition to the selection of optional subjects of Energy Demand Management and Facilities Management in term II. Term III includes two specialist subjects; Energy Systems' Development Feasibility Studies (7 ECTS) is used for both specialisations of the degree while Energy Systems Analysis (7 ECTS) is used in the *Energy Planning* and Renewable Energy Systems (7 ECTS) is used in *Energy Engineering* specialisation. The optional study subjects in term I are the same for both specialisations while in term II there is only one difference in the optional study subjects. It is surprising that there are no specialist optional study subjects in term III. The Panel would have expected more specialised options in term III than the first two terms as the student would have developed more knowledge to allow them to be more selective in an area that they would want to specialise in. IV term is totally devoted to the thesis. The Panel also understood that the *Energy Engineering* specialisation, with the small differences from *Energy Planning* specialisation, was designed to allow some of the students to undertake part of their studies at the University of Alborg in Denmark. However, teachers at the Department have developed the necessary experience now and there are no more students sent to Alborg. Thus it may be useful at this stage to consolidate the two specialisations into one, in particular with the small number of students now undertaking the programme.

While the contents of the subjects based on the provided list of topics taught are suitable for the level of study and for the achievement of the intended learning outcomes, The Review Panel noticed from the sample of the assessment scripts provided during the visit that the level of questions and answers are relatively simple and mainly of qualitative rather than quantitative nature. The Panel were not able to verify that this is the case across all subjects.

From an international perspective (the Panel is aware of the fact that it is an usual practise in Lithuania) it is somewhat unusual for a two-year Master degree programme to start the work on the Master thesis directly in the first semester. Moreover it is not clear whether this represents an advantage to the students. Especially when students moving into this University either from another Lithuanian institutions or even abroad are at that time not familiar enough with the offerings of the various faculty members to make a profound decision on what topic they would like to work on. Moreover, the first two semesters of the programme should result in a deeper understanding of the students of the field also likely influencing their interest on different research questions and, by that, their possible choice of topic for their thesis. The description of the process of preparing and finalizing the Master thesis is overly detailed for the SER.

2.3. Teaching staff

The teaching staff of the programme consists of fourteen teachers, nine of the teachers are full-time while the remaining five are part-time. The amount of effort that part-time lecturers devote to this programme is not clear from the SER. Two of the lecturers are full professors, one of them part-time. While the SER does not provide clear data on the proportion of field subjects delivered by full professors, information sent after the visit show that the two professors deliver 41 % of the study subjects in the *Energy Engineering* and 33 % of the study subjects in the *Energy Planning* which is in line with the legal requirements. **However, one of those professors is part-time and still delivers four study subjects, which is a matter of concern, in particular, if he is involved in other degrees and it represents a high load compared to that typical in other European universities. Also the fact that 15 % of the teaching staff are required to deliver 41 % and 33 % of the study subjects in both variants respectively is unusual.** Eight of the teachers are full-time associate professors, two part-time lecturers and two part-time assistants. With the exception of the two assistants and one of the lecturers, all the remaining teaching staff are educated to a doctoral degree level (92 % of teaching staff hold a PhD which satisfies the legal requirements). All teachers have the necessary practical experience as stipulated by the legal requirements. The average scientific experience is just over 17 years with a good mixture of pedagogical and practical experience. This number of teaching staff, academic qualifications and the range of experience are adequate to delivering the necessary education and achieving the intended learning outcomes. There is a large gap however in the number of years of experience between three teaching staff with 40 years of scientific experience and the remaining staff the highest of which with 15 years scientific experience. There are a number of teaching staff with significant number of years of practical experience who seem to

have started later in their career to gain scientific experience and hence engaged in the pedagogical process.

The composition of the academic staff by academic status has been changing since 2009/10 academic-year in which there were nine professors and five associate professors with no lecturers or assistants. Subsequent years saw the number of professors to drop to 5, 6, 3 and then 2 in the 2013/14 academic-year. The number of associate professors increased from five in 2009/10 to eight in 2013/14 and the year 2013/14 saw for the first time the inclusion of two lecturers and two assistants on the teaching staff of the programme. While the variation in the mix of experience and the introduction of younger teaching staff is an encouraging sign to the sustainability and continuity of the programme, there is a concern that there are not enough associate professors being promoted to professors.

Inspection of the CV's of academic staff shows that all of them are engaged in research demonstrated by their publications. However, almost all publications are at the national level with the exception of less than a handful in conferences in Poland, Latvia and the UK. There does not seem to be any engagement with research at the international level or publications in international journals. There are few external engagements through the ERASMUS programme for example, but these are mostly academic rather than research engagements.

The Review Panel had the opportunity to hold a meeting with the teaching staff on the programme, which was attended by most of them. Most of the teaching staff could communicate in English although only few held a continuous discussion with the Review Panel. The Panel sensed a high level of dedication and enthusiasm by the teaching staff and that they are very eager to get engaged in research activities to progress their career and use this research to underpin the teaching process. However, their ability to engage in meaningful research was hindered by the high teaching load through the number of contact hours with students and the lack of incentives by the University in terms of providing suitable funding to kick-start their research career. It was found also that all PhD students at the Department are supervised by full professors which does not allow teaching staff of lower ranks to develop this skill, for example through acting as a co-supervisors or second supervisors to those PhD students.

2.4. Facilities and learning resources

There are sufficient studying facilities for the students in the programme. The Review Panel did not see any issue of accommodating the group of students on the programme in any of the lecture

rooms available at the institution. The quality of the teaching rooms is generally adequate with suitable seating and visual display units connected to a computer in all the teaching facilities the Panel visited. Some of the teaching rooms are equipped with a computer for each student studying the subject with the necessary software installed and the Panel was able to see one of the practical sessions in action.

Annex 5.1 of the SER lists an array of equipment used for measurements primarily related to the *Building Energetics* degree, but all suitable for conducting experiments during the study in this programme. This shows an adequate level of investment in the laboratories hardware which seems to be regularly updated. In general, the laboratories visited by the Panel were of adequate standards with good equipment necessary to perform experiments relevant to the study subjects. In particular, the thermodynamics and fluid flow laboratory has a wide range of experiments covering many important fundamental concepts and processes. There is a concern however about the close proximity of the test benches designed for various experiments that are conducted simultaneously by different groups of students in regards to health and safety and the level of noise that may be present in the laboratory. The number of technicians supporting the students was also thought not to be adequate. The laboratory that the Panel was told to be the Electronics Lab did not seem to have any electronic equipment and only few out-dated electrical objects were observed.

The new facilities in the Renewable Energy Laboratory are of good standard in terms of hardware and data analysis software. However, there seems to be a limited number of computer workstations with suitable software for use by the students on the Master programme, but the Panel was assured that there are sufficient licences of the software that could be accessed remotely by the students.

The central library has a wide range of resources that can be accessed by students in addition to a number of quiet areas dedicated for the students to work individually or in small groups. The library also provides access to students to a wide range of electronic resources.

All teaching staff make use of the Moodle platform to put teaching materials to students. During a meeting with a group of students, the Panel was able to understand that the students are satisfied with the availability of teaching materials on Moodle and they make full use of it as well as the electronic resources available through the library.

2.5. Study process and students' performance assessment

Entry requirements to the programme follow a formula described in the SER. The formula takes into account some form of weighted diploma grades and publications. The SER indicates that further details are available on the web site, but the Review Panel could not check these details, as they were not available in English. The Panel members were not able to understand the formula clearly. Applicants to the second-cycle of study can apply to up to 16 programmes that should be arranged in the order of preference in their application. If the entrants are selected to a number of study programmes, they are invited to register only in the one highest in their list of preferences and are not allowed to change that once the offer is made. All entrants must have passed compulsory examinations related to their programme of choice. The SER gives a list of specialised subjects that should have been studied by entrants, however, it is not clear to the Panel if these are required for this programme or all second-cycle programmes in the Department. A link is given to further details, but this was found to be broken and most probably information are not in English for the Panel to verify details. However, it is apparent that entrants, who have not passed some of those subjects, have the chance to sit and pass the missing examinations. The admission process is carried out in two stages; however, the link to the web pages containing the details was also broken at the time of checking by the Panel.

Open days are arranged for potential candidates where the students are presented with admissions procedures, composition of the competitive mark and various choices and possibilities.

From the given details and discussions with the programme team during the visit, the Panel feels that there is an organised and well thought admission process despite inability to verify some of the details by the Panel.

The number of students on the programme has been in a steep decline since the academic year 2011/12 where 51 students were registered to 26 students in 2013/14. This is alarming, but it has been explained by the reduction in the number of state-funded places provided by the Government. However, this raises question marks on the future financial viability of the programme. The Review Panel requested an explanation of how the finances for each programme are handled. The Dean explained the system using rough percentages and figures based on the University's financial model. However, there does not seem to be a suitable economic model that assesses the financial viability of individual programmes at the University and thus the Panel was not able to provide meaningful recommendations in this regard.

It is, however, of some concern that a relatively large number of students are dropping out, some at a late stage of the degree. For example, nine students out of 26 from those admitted in 2012 dropped out. The SER explains this by the inability of those students to cope with their studies while at full-time employment. This brings into a question the long-term viability of the entire system where almost all students on the programme are in full-time employment.

The total number of contact hours is 794 comprised of 602 classroom hours and 192 classroom consultation hours evenly distributed across the three teaching semesters. Students are expected to undertake 1286 self-study hours. Students follow a structured timetable prepared by at the Faculty level taking into account teachers time and suitability to students needs. During discussions with staff and students, it was made clear that teaching is done mostly in the evenings to allow students to attend to their day jobs. Also students expressed that lecturers show good understanding to their need to work during the day and provide them with the necessary support when they are not able to attend lectures.

Involvement of students in research and practical research activities is facilitated through involvement with projects in some of the study subjects, conducting research practice and through their final thesis. Of particular importance is the inclusion of the mandatory study subject Research and Innovations. Students are encouraged to publish their research in the proceedings of a conference held at the University and in the Journal ‘Science – Future of Lithuania’. Master students are also invited to participate in organising the conference.

Students on the programme are offered opportunities to study a part of the study subjects abroad, prepare final theses or undergo internships. The Faculty has signed students and teachers exchange agreements under ERASMUS programme with 83 European universities. However, it is difficult to see how this could be applied in practice with all students are in full-time employment during their studies. The Panel however was told by one of the social partners that they would encourage students employed at their organisation to undertake opportunities abroad as it would bring benefit to their organisation.

The University and Faculty have put in place numerous measures to provide the students with adequate academic and social support. Information are made available to students about the objectives of their studies, intended learning outcomes, time tables, optional study subjects and all other necessary material via the University website and other published material. They have the opportunity to meet the Dean and heads of departments at the start of their studies and have the opportunity to ask for clarifications. Students can consult their teachers during published

office hours. During the visit, a number of students mentioned to the Panel that they are very happy with the support given to them by the teachers during office hours and that teachers are also available outside office hours to provide support when needed particularly for students who cannot attend office hours due to their external work requirements. Sports, health and cultural support is also available to students although it is difficult to see how most students can make use of these facilities with their busy study and working life.

The students are assessed for achieving the intended learning outcomes by a number of methods including written examinations, course work, course projects and laboratory reports and oral examinations of the laboratory report when suitable. These are seen to be a suitable form of assessments with a healthy variation of types of assessments. The assessment criteria and methods are made available to students on the web pages at the start of their term. Good care is taken in the preparation of the exam timetables and they are published to students on the web pages and notice boards in the University in advance to allow suitable time for preparations.

While the primary focus of the programme seems to prepare students for a research and innovations career as apparent from the intended aims and learning outcomes, from the Panel's meeting with the alumni, it seems that almost all graduates undertake a professional career. It is recommended that the programme design should have more appreciation of this and allow for more provisions in the design of the programme to help the graduates with their careers.

2.6. Programme management

The Panel found out that there is a clear and transparent management structure of the programme based on information in the SER and discussions during the visit with the University senior management team, the Faculty management team and the programme management team and its teaching staff. The Study Programme Committee within the faculty has the responsibility to approve newly developed or improved curricula and their subjects. Each faculty is divided into a number of departments where the Head of Department and the Study Programme Committee within the Department are responsible for the management, delivery and continuous monitoring and development of the programme.

There is a process of collecting data about the programme through a number of routes. The first is the student feedback questionnaire. This is conducted after each study subject and full participation of students is enforced through sanctions of withholding access to specific Moodle content if they do not complete the questionnaire by the given deadline. The second route is

through intra-faculty feedback. The third route is through questionnaires sent to alumni and the final route is through feedback and interactions with social partners. In addition to that, the Head of Department has regular meetings with top students to hear their views about the curriculum and its delivery.

The data collected is regularly analysed and discussed at the Study Programme Committee and recommendations for changes and improvements are acted upon as suitable. The Panel were able to see evidence of that through for example the introduction of modern analysis software within the curriculum. Students also mentioned that the University is responsive to their feedback and recommendations. However, the student feedback data and the process of acting on the findings should be made more transparent.

The internal study quality assurance system at the University is based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area. Improvement of information system is one of the main objects in study quality management. The SER mentions that the study programme and study subject unit database are updated regularly when new study programmes and new study subjects are developed and present programmes are updated.

III. RECOMMENDATIONS

1. The programme should have more specific intended learning outcomes consistent with the specific focus of the syllabus on building energy, particularly heat supply. It is also suggested that the programme name should reflect this.
2. It may be more practical to consolidate the two specialisations of the programme into one specialisation, in particular, the secondment of students from the *Energy Engineering* programme at Alborg is not happening anymore.
3. The University should review teaching staff qualifications to ensure that there are sufficient full professor level teachers delivering the study subjects with appropriate teaching load.
4. The Faculty should provide opportunities and suitable pump prime funding for academic staff to get involved in high quality research and participate in the supervision of PhD students to allow them to develop their career.
5. The University should review the provisions in laboratories which were thought to have experiments in a very tight layout that may not constitute a safe and suitable environment for conducting experiments.
6. The declining number of students is of concern. The Department should review the situation in the light of market requirements and external competition and consider marketing the programme beyond the capital for example.
7. There is a high rate of drop-out of students from the programme at various stages of their study. This is more likely to be related to the inability of students to cope with the full-time study while at full-time employment. It would be worth considering the delivery of the programme on a part time-basis to allow such students to cope with the pressures of work and study.
8. It is recommended that the programme design should have more appreciation of the fact that almost all graduates undertake a professional career rather than research career.
9. The student feedback data and the process of acting on the findings should be made more transparent.

IV. EXAMPLES OF EXCELLENCE

1. There is a very good partnership between the Department and social partners; the Department listens to the recommendations and advice of the social partners and continuously develops the programme to meet the market requirements, while social partners provide support to students particularly in application projects for their theses.
2. Alumni expressed satisfaction with what they learned while undertaking the programme and that it is largely relevant to their work. They for example picked up that more simulation is required in the syllabus as required by modern working environment. However, the Panel found out that this is already happening within the programme. Students can now access simulation programmes installed at the University remotely from their homes. This is helped by the well-developed Internet infrastructure in Lithuania.
3. There is a good evaluation system of the teaching and learning process at the Department. This is composed of intra-faculty evaluations and student evaluation of teaching staff. The Department and University are serious about implementation of change in programme content and practices based on evaluation results.

V. SUMMARY

The study programme on *Energy Engineering and Planning* hosted by Vilnius Gediminas Technical University provides an excellent environment for study. The University has a good organisational structure with clear management and decision-making structure which facilitates the effective and efficient running of the programme and its continuous development to meet the needs of employers and the society. The students benefit from a well-structured programme and good support from the University and teaching staff.

The Panel was able to verify that the facilities available to student are generally good. This covers lecture rooms, laboratories and library facilities in addition to the electronic access to teaching materials and the ability to remotely access analysis software necessary for their project work.

The Review Panel however is concerned about the continuous decline in the number of students admitted to the programme. There is also a concern about the high rate of drop-out at the various stages of study despite the fact that these were explained by the reduction in Government funded places for higher education and the involvement of students in full-time employment while undertaking the full-time mode.

It is the view of the Review Panel that the programme should have more specific intended learning outcomes consistent with the specific focus of the syllabus on building energy, particularly heat supply. It is also suggested that the programme name should reflect this.

In a short term the University should review teaching staff qualifications to ensure that there are sufficient full professor level teachers delivering the study subjects with appropriate teaching load.

VI. GENERAL ASSESSMENT

The study programme *Energy Engineering and Planning* (state code – 621E30003) at Vilnius Gediminas Technical University 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. Abdalnaser I. Sayma
Grupės nariai: Team members:	Prof. Zbigniew Hanzelka
	Prof. Frank Behrendt
	Dr. Thomas Flower
	Dr. Ramūnas Gatautis
	Mr Giedrius Gecevičius

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO ANTROSIOS PAKOPOS
STUDIJŲ PROGRAMOS *ENERGIJOS INŽINERIJA IR PLANAVIMAS* (VALSTYBINIS
KODAS – 621E30003) 2016-02-29 EKSPERTINIO VERTINIMO IŠVADŲ
NR. SV4-72 IŠRAŠAS**

<...>

VI. APIBENDRINAMASIS ĮVERTINIMAS

Vilniaus Gedimino technikos universiteto studijų programa *Energijos inžinerija ir planavimas* (valstybinis kodas – 621E30003) 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)

<...>

V. SANTRAUKA

Vilniaus Gedimino technikos universitete vykdoma studijų programa *Energijos inžinerija ir planavimas* užtikrina puikią studijų aplinką. Universitete yra nustatyta aiški organizacinė, sprendimų priėmimo bei vadybos sistema, kuri sukuria prielaidas efektyviam ir veiksmingam programos vykdymui bei tęstiniam tobulinimui, siekiant darbdavių ir visuomenės poreikių atitikimo. Tinkamai sudaryta programa bei reikiama parama iš universiteto ir akademinio personalo teikia didžiausią naudą studentams.

Apskritai, ekspertų grupė gali patvirtinti, kad materialieji ištekliai skirti programos vykdymui yra tinkami. Tai pasakytina apie auditorijas, laboratorijas ir biblioteką, taip pat elektroninę prieigą prie mokymo medžiagos ir galimybę nuotoliniu būdu prisijungti prie analizei skirtos programinės įrangos, reikalingos darbui su projektais.

Vis dėlto ekspertai yra susirūpinę dėl tęstinio mažėjančio studentų skaičiaus. Taip pat susirūpinimą kelia didelis įvairiais studijų etapais nubyrančių studentų skaičius, nors tokia tendencija vizito metu ir buvo aiškinama mažėjančiu valstybės finansavimu studijoms bei tuo, kad studentai ne tik studijuoja nuolatinėse studijose, bet ir dirba visą darbo dieną.

Ekspertų grupės manymu, reikėtų peržiūrėti studijų programos numatomus studijų rezultatus, siekiant kad jie būtų labiau susiję su programos esme – pastatų energetika, ypač su šilumos tiekimu. Tai taip pat turėtų atsispindėti studijų programos pavadinime.

Universitetas trumpuoju laikotarpiu turėtų daugiau dėmesio skirti akademinio personalo kvalifikacijai ir užtikrinti, kad studijų dalykus dėstytų pakankamai profesoriaus pedagoginį vardą turinčių dėstytojų, su nustatytu tinkamu darbo krūviu.

<...>

IV. IŠSKIRTINĖS KOKYBĖS PAVYZDŽIAI

1. Katedra labai sėkmingai bendradarbiauja su socialiniais partneriais – yra įsiklausoma į jų rekomendacijas, patarimus, kurių pagrindu studijų programa yra nuolat tobulinama, siekiant atitikimo darbo rinkos poreikiams, o socialiniai partneriai teikia paramą studentams, ypač rengiant taikomuosius projektus baigiamiesiems darbams.
2. Absolventai susitikimo su ekspertais metu teigė, kad tai, ko išmoko šioje studijų programoje atitiko jų lūkesčius, ir kad tai yra labai susiję su jų darbu. Visgi jie nurodė, kad programos turinyje turėtų būti daugiau simuliacijos, nes to itin reikia modernioje darbo aplinkoje. Tačiau ekspertų grupė buvo informuota, kad tai jau yra atlikta. Šiuo metu studentai nuotoliniu būdu gali prisijungti prie universitete įdiegtų simuliacinių programų. Prie to prisideda ir puikiai Lietuvoje išvystyta interneto infrastruktūra.
3. Katedroje taikoma gera mokymo ir mokymosi procesų vertinimo sistema. Ji susideda iš tarpfakultetinių vertinimų ir studentų atliekamų dėstytojų vertinimų. Katedra ir universitetas yra rimtai nusiteikę studijų programos turinio ir praktikų tobulinimo atžvilgiu, pagal grįžtamojo ryšio rezultatus.

<...>

III. REKOMENDACIJOS

1. Studijų programos numatomi studijų rezultatai turėtų būti konkretesni, labiau atitinkantys programos orientaciją į pastatų energetiką, o ypač šilumos tiekimą. Tai turėtų atsispindėti ir studijų programos pavadinime.
2. Būtų praktiškiau sujungti dvi programos specializacijas, tai ypač aktualu *Energijos inžinerijos* atveju, nes reikmės vykdyti dalį programos Alburge nebėra.
3. Universitetas turėtų atkreipti dėmesį į dėstytojų kvalifikaciją ir užtikrinti, kad studijų dalykus dėstytų pakankamai profesoriaus pedagoginį vardą turinčių dėstytojų, kuriems darbo krūvis būtų tinkamai nustatytas.
4. Fakultetas turėtų suteikti galimybes ir reikiamą finansavimą akademinio personalo įsitraukimui į aukšto lygio mokslinių tyrimų vykdymą, taip pat apsvarstyti galimybę leisti didesniai skaičiui dėstytojų vadovauti doktorantų disertacijoms.
5. Universitetas turėtų įvertinti darbo sąlygas laboratorijose – jose yra per mažai erdvės vykdyti eksperimentus, o tai nėra tinkama ir saugi aplinka studijoms.
6. Mažėjantis studentų skaičius kelia susirūpinimą. Katedra turėtų įvertinti situaciją atsižvelgdama į darbo rinkos poreikius, išorės konkurenciją ir apsvarstyti galimybę studijų programą reklamuoti ne tik sostinėje.
7. Studentų nubyrežimo rodikliai visu studijų metu yra aukšti. Taip galimai yra dėl to, kad studentams yra per sudėtinga derinti nuolatinės studijas ir darbą visą darbo dieną. Rekomenduotina apsvarstyti galimybę studijų programą vykdyti ir iššėstine forma, kad studentai galėtų sėkmingiau derinti dvi veiklas.
8. Programos vykdytojai turėtų labiau atsižvelgti į tai, kad beveik visi absolventai pasirenka profesinę, o ne mokslinę karjerą.
9. Studentų grįžtamojo ryšio teikimo ir reagavimo į jo pagrindu gautus duomenis sistema turėtų būti skaidresnė.

<...>

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)