STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Aleksandro Stulginskio universiteto

STUDIJŲ PROGRAMOS *ENERGETIKOS INŽINERIJA* *(valstybinis kodas – 612E30003)*

VERTINIMO IŠVADOS

EVALUATION REPORT

OF *ENERGY ENGINEERING (state code – 612E30003)*

STUDY PROGRAMME

At Aleksandras Stulginskis University

1. **Dr. Thomas Flower (Chair of the Team),** *academic,*
2. **Prof. Zbigniew Hanzelka,** *academic,*
3. **Dr. Ramūnas Gatautis,** *representative of social partners',*
4. **Mr Giedrius Gecevičius**, *students' representative,*
5. **Prof. Abdulnaser I. Sayma,** *academic, (not present during visit to ASU),*
6. **Prof. Frank Behrendt,** *academic, (not present during visit to ASU).*

Evaluation Coordinator Ms Eglė Grigonytė

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Energetikos inžinerija***
Valstybinis kodas	612E30003
Studijų sritis	Technologijos mokslai
Studijų kryptis	Energijos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	Nuolatinė (4 metai), ištęstinė (6 metai)
Studijų programos apimtis kreditais	240 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Energijos inžinerijos bakalauras
Studijų programos įregistravimo data	Lietuvos Respublikos švietimo ir mokslo ministro 1997 m. gegužės 19 d. įsakymu Nr. 565.

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	***Energy Engineering***
State code	612E30003
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 Energy Engineering
Date of registration of the study programme	19th May 1997, under the Order of the Minister of the Ministry for Education and Science of the Republic of Lithuania No. 565.

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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 (hereafter, the SER) 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.

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

Aleksandras Stulginskis University (hereafter, ASU) is a state higher education institution possessing deeply rooted traditions of agriculture science and studies. In 2014 the numbers of students, teachers and research fellows working in the University were 4536, 343 and 53, respectively.

The University mission and the University strategy, developed in 2012 "ASU Strategy 2020" go well together with the provisions of the development of higher education in Lithuania that is reflected in the Law on Higher Education and Research. Preamble of the Law states that "The mission of higher education and research is to help ensure the country's public, cultural and economic prosperity, provide support and impetus for a full life of every citizen of the RL, and satisfy the natural thirst for knowledge". In particular, the University assumes a social responsibility for the scientific support of one of the most important components of state economy that is for agriculture and food production.

Presently 48 programmes of the first and second cycle in biomedical, social and technological sciences are carried out in the University. All these programmes are directly designed for agriculture, forestry, rural development, sustainable use of natural resources and in exact accordance with the previous mission of the University. University study programmes are unique in Lithuania, because there are no universities in Lithuania that have such programmes. According to the University website, the University actually has an unusual abundance of first cycle study programmes with similar content:

- *Engineering of Agroenergetics* (recently renamed to *Energy Engineering*);
- *Agricultural Engineering and Management*;
- *Agricultural Mechanical Engineering*;
- *Renewable Energy Resources Engineering (Biomass Engineering)*;
- Further five first cycle degrees in Technological Sciences.

Agriculture in Lithuania is a traditional, consistently developing and modernizing sector of economy. This sector produced 4.6 % of total earned value in the year 2013. Annual growth of this sector is stable compared with other economy sectors, and in the latter years it was the highest, 1.8 %. Development of this sector determines also prerequisites for the development of other sectors, first of all of food industry and bioenergetics. Sector undergoes rapid modernization; significant part of structural support of the European Union is allocated in this sector. **Despite decrease of number of employees in this sector caused by rapid modernization in order to ensure innovations and development, sector is in need of professionals who master modern technical, biological and social technologies.** It is stated in the documents of strategic development that lack of highly qualified professionals in rural areas is a serious problem.

In 2011 study of the demand of specialists in the field of agriculture was performed. This study showed that training of specialists with higher education in the field of agriculture should not be reduced, and in some study programmes it should be increased. However, studies in the field of agriculture are not popular in Lithuania among the best secondary school graduates as they are not popular in many countries. Due to absence of state-funding for agricultural studies number of persons desiring to study is rapidly decreasing.

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 *04/12/2015*.

1. **Dr. Thomas Flower (Chair of the Team)**

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

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. **Dr. Ramūnas Gatautis**

Research Associate at Lithuanian Energy Institute, Lithuania.

4. **Mr Giedrius Gecevičius**

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

5. **Prof. Abdulnaser I. Sayma (not present during the visit to ASU)**

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

6. **Prof. Frank Behrendt (not present during the visit to ASU)**

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

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The degree has undergone an external evaluation in 2012. The assessment was basically positive, however, closed with a number of recommendations resulting in a three-year accreditation. One area of criticism was "improper and incomplete definition of the programme aims, objectives and learning outcomes." It was criticized that the website of the University provided different descriptions of the programme depending on language (Lithuanian vs. English). This weakness has been addressed. After this review the Panel found the online programme description (www.asu.lt/university/studies/study-programmes-at-university/first-cycle-study-programmes) which is now sufficiently comprehensive and thus this point has been sufficiently addressed. One problem which still persists is that the website lists the programme under its old title *Engineering of Agroenergetics*.

Another minor criticism in the online English description of the study programme is related to the terms used defining the programme aim: "The main aim of the study programme is to train broad erudition and highly qualified specialists, aware of the principles, theories and methods of power and heat energy engineering, able to design and implement the facilities and systems of agricultural energetics as well as facilities and systems of renewable energy; assess the impact of energy on the environmental objects." *Erudition* is an unusual word, not understandable to the average technical student and can mean "deep wide learning" or "extensive knowledge acquired chiefly from books". The word *erudition* is not used in the SER, instead the wording "The main aim of the study programme is to train highly qualified specialists that have extensive expertise …" is used. This is the clearer description understandable to the public.

This, however, also leads to some more points, that the English online description as to intended learning outcomes and information contained in the SER are not fully consistent. Assuming that the SER is the leading document, online information should be updated.

The study programme convincingly addresses a society need, not only in Lithuania, but across Europe. The content and description of the programme is academically sufficiently high whilst maintaining a practical approach to business and society needs. Sadly, the numbers of students taking the degree are low (2012:9, 2013:11, 2014:20). Pro-active marketing of the degree may be required to assure the minimal number of students to maintain the scope of the degree.

Looking through the SER, there is a statement of objectives and sub-objectives that mentions key requirements. At the general level, important aspects such as personal development, creativity and critical thinking, broad expertise and critical thinking are listed. At the specific level, fundamental knowledge in the scientific and engineering topics is also listed. In addition, specialist skills and abilities are listed.

One of the goals of the studies is that graduates should become managers in the energy industry. The Panel could not find much evidence of tuition in the field of project management, people leadership and teamwork which are normally key skills of modern managers. This should be addressed in the future.

In conclusion, it can be confirmed that the programme aims and intended learning outcomes are well defined, clear and publicly accessible and are based on the requirements of the public or the labour market needs. The programme aims and intended learning outcomes are consistent with the first level of studies and the qualification offered.

The name of the programme *Energy Engineering* is reasonably accurate and it is compatible with the curriculum and targeted intended learning outcomes. Broad principles of general energy engineering are taught whilst a particular focus is applied to the specific business of agroenergetics. Even though the focus of the programme is still on biofuels, with a strong foothold in electrical engineering, the attempt to broaden the technical area to encompass also hydro-, wind- and solar-energy is less convincing.

Strength: Good market alignment with the contents of the programme.

Weakness: Degree maintains a focus on agroenergetics though recently it has undergone a name change to *Energy Engineering*. Some typical areas of energy engineering are still not taught.

2.2. Curriculum design

The programme covered here is a Bachelor degree designed to be completed in four years and the workload amounts to 240 ECTS. This is compliant with the Bologna declaration and Lithuanian legal requirements. The University has subdivided the degree programme into educational components of different sizes. The size of each educational component is from 3 to 8 ECTS. The content of each educational component corresponds to the intended learning outcomes of that component. The number of ECTS per educational component has been

carefully assigned. The size of an educational component varies according to the workload for the average student. The content of an educational component is in each case thematically defined. Taking student exchange with foreign countries into account, both size and content of educational components taught between the fifth and seventh semester (typical mobility semesters) are appropriate. The educational components (from 4 to 6 ECTS) are neither too big to prevent transfer of credits and marks for mobile students, nor are they too small, which would lead to an inappropriate high number of exams.

On the subjects of study, the combination of general subjects, specialised subjects and electives is very interesting and the principle is commended. The programme is constructed on a very sound foundation in mathematics and natural sciences plus 18 ECTS of general subjects at university level thereby meeting the legal requirements.

The programme-defining technical subjects do not start before the second year and are predominant from the fourth semester onwards. In total 200 ECTS are taught in "subjects of study field" and are clearly marked in the curriculum thereby meeting the legal requirements.

The total volume of tuition in practical placement amounts to 15 ECTS, accumulated in three different fields (Technological Practical Training (7 ECTS), Engineering Design Practical Training (5 ECTS), one week in Electrical Equipment and Safety (1 ECTS), one week in Basics of Agronomy (2 ECTS)). The Panel find that it would be more convincing if the practical training was accrued in only two subjects and not distributed over four subjects. However, as reported the programme meets the legal requirements.

12 ECTS are allocated to the preparation and defending of the undergraduate thesis in the last semester, thereby meeting the legal requirements.

The programme is designed in a way that in each semester 30 ECTS are to be achieved, with the exception of the first semester (27 ECTS) and the third semester (33 ECTS). The workload is thus sufficiently evenly distributed. No harmful repetition in the subjects taught was found.

The study programme aims to cover a very broad range of technical subjects relevant to energy engineering. A deeper technical specialisation has been renounced to the benefit of a stronger business focus, particularly in the field of agroenergetics. In order to truly earn the more general title of *Energy Engineering* and differentiate itself from the former title of *Agroenergetics*, more specialisation in wind-power, solar-power, hydro-power, geothermal-power and district heating and less specialisation in agronomy, biosystems, biogas and biofuels would be recommended.

Particularly more practical training in non-agricultural fields should be possible and encouraged. However, assuming that the programme is designed to meet the requirements of the agricultural energetics business field, then currently this is very well-achieved.

The major engineering field of construction, design and finite-element analysis is covered only very lightly. Students are thus not empowered to actually design mechanical equipment. The same is true of fluid mechanics and CFD which can lead to difficulties in designing flow apparatus and flow systems. The lack of tuition in numerical methods, FEA, Matlab-Simulink and CFD was commented on in the previous evaluation report and the Panel found little to no evidence of a change there. Modern society is strongly affected by digital technologies. This area of technology seems to be lacking in the study programme.

In conclusion the content and methods of the subjects are appropriate for the achievement of the intended learning outcomes. The scope and content of the programme are sufficient to ensure the achievement of the intended learning outcomes and, with the exception of computer based analysis, reflect state-of-the-art in the field of energy technology.

Strength: Curriculum is well constructed to successively teach the students a broad range of technical subjects on the basis of a very sound foundation in science.

Weakness: Computer based engineering is not sufficiently in the focus. Panel recommends to broaden the scope of application of energy technology beyond agroenergetics into other fields relevant to Lithuania.

2.3. Teaching staff

34 of 42 study field subjects are taught by scientists thereby easily meeting the minimal legal requirements[1]. The qualifications and numbers of the staff are adequate to ensure the achievement of the intended learning outcomes. 20 of the 29 reported academic staff teaching on the programme hold doctorate degrees. Given the low enrolment to the study programme, the number of teaching staff is fully adequate to ensure the achievement of the intended learning outcomes.

[1] General Requirements of First Degree and Integrated Study Programmes, approved by the order of the Minister for Education and Science of the Republic of Lithuania on 9 April 2010 No V-501.

Checking through the experience of the academic staff, there seems to be an uneven distribution of this experience with the spectrum heavily weighted towards the more experienced staff who have been there for a long time. There are very few junior staff or those possessing intermediate experience which is likely to create problems in the future. The Panel recommend to start involving academics at various levels of experience to provide for continuity and variation of skills and approach to the benefit of students. The SER mentions that the average age of the academic staff is getting younger year on year compared to 2011 review, however, the rate of progress in that aspect is slow. The average age of professors has dropped between 2010 and 2015 from 60 to 58.8 (only a drop of 1.2 years) and the average age of associated professors has dropped by a mere 1.1 years. However, at this moment the Review Panel is convinced that staff turnover is able to ensure an adequate provision of the programme.

The Review Panel is encouraged by the fact that a high proportion of academics are reported on being active researchers in their respective field. The quality of research work is not relevant for this evaluation and cannot be judged based on the documentation provided or by the insight gained during the site visit. Major research work is being done in the fields of bio-fuels and this fits well with the curriculum in the seventh and eighth semester. The volume of research work performed with industry/third party is low and correspondingly the budget is also small. The associate professors have a heavy teaching load (15 to 18 hours per week), which leaves little time for research work and personal further development or scientific exchange.

Staff proficiency in the English language is on average rather low. This is a major limitation in order to provide study subjects taught in English that would also encourage incoming students mobility. There is now an extensive student exchange programme through ERASMUS, which seems to address one of the recommendations of the previous programme evaluation. International exchange of staff remains low. In five years academic staff have participated under the regulations of ERASMUS in a total of 45 international trips. Given four professors and eleven associate professors that is just one trip per person per year. This is not a very convincing number. The SER states that "Their trips are partially inhibited by insufficient readiness to communicate in a foreign language and limited financial resources".

The staff is listed as having proficiency in German and French ("10 teachers from the first cycle declare their foreign language as German (33 %), 3 teachers – French (10 %)"). The Panel were not made aware of specialized subjects being taught in French or German that could attract students with those language background from abroad to study at the university.

Strength: Large proportion of well-trained academic staff.

Weakness: Proficiency in English speaking is not good. Heavy tuition workload hinders research activities of associate professors.

2.4. Facilities and learning resources

The University campus is a wide area of land with scattered buildings and grassy areas in between. Most buildings have recently been renovated and are in a good shape. A sufficient number of lecture halls and student classrooms are available. These are equipped with the necessary furniture and basic didactic material. Projectors and computers for multimedia-based instruction are available. Very modern didactic equipment like digital whiteboards (smartboards) is missing. However, the premises are adequate both in their size and quality for the study programme.

The University uses the public domain software bundle Moodle as a modern eLearning tool. Interviewed students confirmed having access to the University servers from their private computers. Moodle, however, is only being used by a small number of the staff and the increase rate of use is very slow. The reason for this is not clear. Possibly staff members need more training or stronger encouragement.

The SER mentions the campus-wide availability of Internet access and a more limited coverage of wireless Internet access. In contrast to the prior report no mention is made in the SER on EDUROAM. During the Panel visit, the Internet availability was supplied through EDUROAM access points as secondary channel "ASU-GUEST" with a password for the visiting people, who have not any authentication systems at their own institutions. The Panel members had free possibility and could connect directly to EDUROAM with their own authentication.

The quality and accessibility of library resources is sufficient.

The quality and quantity of computer equipment and its accessibility to students is satisfactory.

The Review Panel has no complaints and received no complaints or critics from the students as to arrangements for students' practice, with the exception of the statement under 2.5 below.

The quality of the laboratories in the home institute in the field of agroenergetics is good. Laboratories provided by neighbouring institutes, particularly in electrical engineering are good.

Laboratories focused on non-bio forms of energy were less well equipped. If the Faculty truly wishes to strengthen the broader approach to energetics investment will be required.

Strength: Facilities as such are fully sufficient for the undergraduate degree.

Weakness: Wireless Internet access remains insufficient. Use of Moodle is limited.

2.5. Study process and students' performance assessment

Students are admitted according to the national regulations based on high school graduation results. Access to the state-financed places is competitive and one has to meet the standards. Those not admitted to state-funded places get access to the programme if they pay tuition on their own. Results for the past years are given in the SER:

Year of admission	Full-Time-Students			Part-Time-Students		Total
	SF	NF	TF	SF	NF	
2010	7	3	-	1	6	17
2011	10	6	-	-	-	16
2012	5	4	-	-	-	9
2013	3	2	-	1	5	11
2014	3	6	6	3	2	20
Total	28	21	6	5	13	73

The level of students entering the programme to non-state-funded places is markedly lower than the state-funded places. It was not clear to the Panel whether this lower level is satisfactory to successfully follow the programme and ultimately attain the required academic level (a table from the SER):

Year	Competitive scores to state	Competitive scores to	Competitive scores to non-

	financed places			targeted funding places			financed places		
	highest	lowest	mean	highest	lowest	mean	highest	lowest	mean
2010	18,56	14,32	16,44	-	-	-	13,89	4,02	8,9
2011	18,38	12,60	15,49	-	-	-	14,80	3,68	9,2
2012	18,48	12,54	15,51	-	-	-	11,00	4,00	7,5
2013	16,98	15,76	16,39	-	-	-	3,40	2,20	2,8
2014	6,98	4,80	5,89	3,52	2,54	3,03	2,90	1,31	2,10

A change in methodology happened between the years 2013 and 2014. Overall, the numbers of students on the programme are extremely low. The minimal requirements to enter the programme are not convincing. The lowest grades of non-financed places are obviously extremely low. It is not clear what qualifies these students to potentially be successful in the programme.

The University maintains an Internet page giving all the necessary information concerning the programmes.

The academic year is organized in two semesters. Timetables are scheduled rationally. The study classes are well distributed during a week and a semester. The sequence of the different subjects follows a consistent and well-elaborated scheme. The number of study hours invested by the students per week is fully acceptable. It seems that working and earning for living simultaneously while studying affects the performance in a negative way, this is, however, more an issue in second cycle degrees than in the first cycle. The drop-out rate is low (see a table below). Overall, the organisation of the study process ensures an adequate provision of the programme objectives and the achievement of the intended learning outcomes (a table from the SER):

Year of admission	Year of graduation	Number of matriculates (in persons)	Number of students having successfully completed the	Ratio (%)

			studies (in persons)	
2008	2012	38	14	36,8
2009	2013	19	12	63,1
2010	2014	10	10	100

Students are encouraged and able to participate in research as part of their studies, however, research is primarily limited to the field of bio-energetics. Thus students have no or only very limited access to research options in many areas of their studies. Students commented on the fact that they would prefer more opportunities for active practical application of the subjects taught and less classroom work. This corresponds well with the findings from the previous Panel, that tuition is rather conservative and lacking in activating teaching forms.

Student exchange is made possible by the University though not very actively pursued by the students. Since almost all tuition in the study programme is in Lithuanian there is little opportunity for incoming students or researchers. The main reason against mobility given by the students is their necessity to work to cover their costs of living. The lacking mobility of the students decreases their chances to be successful within European labour market. Staff exchange is a critical factor in fostering student mobility. Staff exchange is, however, very limited and sometimes only for short periods at a time. For such a small country as Lithuania, exchange is a very important aspect of scientific work. The Review Panel encourages a much stronger focus on international staff exchange for at least a semester at a time.

The Faculty ensures an adequate level of academic support to the students. The University promotes programmes to provide adequate social support, which does not stop many students from working part-time in parallel to their study programme.

Assessment of almost all study subjects is performed by written examination. Oral examinations are basically unknown. There was no clear reason given for this. Even so, the assessment system of students' performance is clear, adequate and fair.

The final thesis assessments correspond to the University regulations. The level of the theses is satisfactory compared to international standards. The assessment sheets of exemplary theses

examined during the site visit demonstrate meticulous care in the assessment process, however since all papers were in Lithuanian it was somewhat difficult to truly assess the scientific quality and depth.

The graduates are generally satisfied with job opportunities that they can find upon completion the degree and the employers are content with the scope and depth of skills achieved during the undergraduate programme. Sadly, the group of alumni that the Panel could speak to was mostly Masters Alumni and hardly professionally active Bachelor Alumni.

Strength: Low number of drop-outs. The alumni are very content with their choice of degree.

Weakness: Number of students entering the programme is very low. Minimal student performance requirements to enter the Bachelor degree and achieve the targeted academic standard are not clear. Activating forms of tuition are hardly used.

2.6. Programme management

Responsibilities for the curriculum and quality of education are clearly allocated and implemented. The various bodies and persons are active in their roles (Dean, Dean's office, Study Programme Committee, Faculty Council, meeting of the Academic Community of the Council). However, incentives for the teaching staff to provide excellent education, participate in eLearning and implement innovative methods of tuition are still rather weak. The Panel recommends the faculty to explore how this can be improved.

Information and data on the implementation of the programme are regularly collected and analysed. The SER describes an annual programme evaluation process, which involves all stakeholders and seems to follow an extensive process leading to implementation of improvements and enhancements to the programme in a timely manner for the next round. This helps in addressing the fourth recommendation of the previous evaluation ("The university and the faculty should reconsider the evaluation of the educational components. The peer team recommends the transition from the traditional summative evaluation to a modern formative evaluation"), however, there is no clear evidence of peer evaluation of subject delivery or assessment procedures except in the final thesis which is more a check on achieved academic proficiency and less a check on subject delivery.

Students are encouraged to provide feedback and assessments of the subjects they participated in, however, the participation is insufficient. Students are also not particularly active in the formal bodies that work on study reform (Faculty Council and Study Programme Committee). None of the students that were questioned were aware of this opportunity to influence the programme in the future.

The evaluation and improvement process involves stakeholders from outside the University. There is a good interaction between the social partners and the Faculty, particularly in a non-formal approach. More attention could be given in attracting lecturers from social partners to provide state-of-the-art insights to technical applications and approaches to problem-solving, be it not for a full semester but for individual lectures.

In conclusion, the Review Panel finds that programme is regularly reviewed, internal and external evaluations are used to improve the programme (in particular cases to some extent) and thus the defined quality assurance measures are effective and efficient enough.

Strength: The study programme is generally well organised and there is an active process for study reform.

Weakness: Student participation in tuition evaluations and degree reform is weak. Peer reviews of study subject delivery should be enhanced.

III. RECOMMENDATIONS

1. The title of the programme is *Energy Engineering*. The basic technologies taught are applied primarily to the field of agroenergetics. The Panel recommends to broaden the area of application to other energy fields relevant to Lithuanian market.
2. The programme teaches a broad scope of engineering skills relevant to the field of energy engineering in the agricultural business. The Review Panel recommend a deepening and broadening of tuition in the areas of computer based analysis and design.
3. English speaking abilities of the staff and international exchange should be enhanced.
4. The use of Moodle and distance learning technologies should be improved.
5. As commented on in the previous external evaluation report, the application of activating learning formats such as problem based learning should be increased and the teaching staff trained and motivated for this purpose.
6. The SER does not in itself discuss areas of weaknesses and improvement and what is already being done to rectify these. In the future this should be changed. Also a better organisation of the description of studies as supplied to the Review Panel should be provided (not alphabetical according to title of subject in Lithuanian).
7. A closed feedback loop to the students about improvement measures that are implemented should be visible.

IV. EXAMPLES OF EXCELLENCE

The degree has a clear market focus (energy technology in the agricultural field off business) which though quite narrow is very relevant for Lithuania in developing its energy infrastructure. The degree achieves in an excellent way the target of educating students to be active participants in this business environment.

Learning and research resources in the field of bioenergetics are excellent.

V. SUMMARY

Main positive quality aspects:

1. The Bachelor study programme appears to prepare the graduates well for a business career. The Bachelor degree provides a very substantial basis in fundamental sciences, agroenergetics and electrical technology (good generalist), and offers interesting elective study subjects in various fields of energy technology.
2. The Panel was informed that the students are very satisfied with the availability of the teaching staff and receive all the tuition support they require.
3. The Institute has good connections to the relevant bio-industry and receive valuable feedback on the state-of-the-art developments and indications in which direction the programme can be further developed.
4. The laboratories are well equipped and suitable for the teaching requirements. The Review Panel only see potential for research in the field of biotechnology.

Main negative quality aspects:

1. Some areas of application of energy engineering technology are insufficiently taught.
2. The Review Panel found little to no proof that the Institute has modernised its learning methods as recommended in the last evaluation report (2012). The pedagogical methods still appear to be rather conservative.
3. The first level degree is lacking in the field of numerical engineering methods (Finite Element Analysis, Computerized Flow Modelling, Matlab-Simulink, Computer Science).
4. Distant learning techniques are hardly employed and the content on the Moodle platform is only slowly being expanded.
5. The average level of command of the English language by the staff is low. Staff should be motivated to improve their language capabilities.
6. The number of students on the programme is very low, close to the absolute minimal requirements to maintain the study programme. It was not clear what the Institute is undertaking to attract more students to its study programme.
7. The SER that the Panel reviewed contains no self-criticism as to what is working well, what is working less well and what is being undertaken to improve the situation.
8. The Description of study subjects in the Annex to the SER is poorly organised, particularly for non-Lithuanian speakers.

9. Feedback that is received from the students at the end of the semesters is only sporadic. A closed feedback loop to the students about improvement measures that are implemented is not visible.

VI. GENERAL ASSESSMENT

The study programme *Energy Engineering* (state code – 612E30003) at Aleksandras Stulginskis 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	3
2.	Curriculum design	3
3.	Teaching staff	3
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	3
6.	Programme management	3
	Total:	**18**

*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:	Dr. Thomas Flower
Grupės nariai: Team members:	Prof. Zbigniew Hanzelka
	Prof. Frank Behrendt
	Prof. Abdulnaser I. Sayma
	Dr. Ramūnas Gatautis
	Mr Giedrius Gecevičius

ALEKSANDRO STULGINSKIO UNIVERSITETO PIRMOSIOS PAKOPOS STUDIJŲ PROGRAMOS *ENERGETIKOS INŽINERIJA* (VALSTYBINIS KODAS – 612E30003) 2016-03-21 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-78 IŠRAŠAS

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VI. APIBENDRINAMASIS ĮVERTINIMAS

Aleksandro Stulginskio universiteto studijų programa *Energetikos inžinerija* (valstybinis kodas – 612E30003) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	3
4.	Materialieji ištekliai	3
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	3
	Iš viso:	**18**

* 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)

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V. SANTRAUKA

Pagrindiniai teigiami kokybės aspektai:

1. Bakalauro studijų programoje yra parengiami absolventai, kurie lengvai integruojasi į darbo rinką. Studijų programoje studentai įgyja pakankamas pagrindines fundamentaliųjų mokslų, agroenergetikos ir elektros technologijų žinias, taip pat gali rinktis studijų dalykus iš įvairių energijos technologijų krypčių.
2. Ekspertų grupė buvo informuota, kad studentai yra labai patenkinti suteikiamomis galimybėmis bendradarbiauti su dėstytojais ir gauna visą reikiamą akademinę pagalbą.
3. Institutas palaiko glaudžius ryšius su biopramone ir gauna vertingų atsiliepimų apie modernias sektoriaus plėtros kryptis bei patarimų, kaip studijų programą tobulinti.

4. Studijoms skirta įranga laboratorijose yra tinkama. Vis dėlto ekspertų grupė mokslinių tyrimų potencialą mato tik biotechnologijų kryptyje.

Pagrindiniai neigiami kokybės aspektai:

1. Tam tikroms energetikos inžinerijos technologijų taikymo sritims yra skiriama nepakankamai dėmesio.
2. Ekspertų grupė rado nepakankamai įrodymų, kad Institutas modernizavo dėstymo metodus, kaip buvo rekomenduota po ankstesnio išorinio vertinimo (2012 m.). Pedagoginiai metodai vis dar yra gana konservatyvūs.
3. Pirmosios pakopos studijų programoje trūksta skaitmeninės inžinerijos metodų (įtempių analizė galinių elementų metodu, kompiuterinis srautų modeliavimas, Matlab-Simulink, kompiuterių mokslas).
4. Nuotolinio mokymosi metodai beveik nenaudojami, o Moodle platforma turinio atžvilgiu yra pildoma labai lėtai.
5. Vidutiniškai akademinio personalo anglų kalbos lygis yra žemas. Reikėtų motyvuoti personalą gerinti anglų kalbos įgūdžius.
6. Studijų programos studentų skaičius yra labai mažas, artimas minimaliam, kad studijų programa būtų vykdoma. Kokių priemonių Institutas imasi siekdamas pritraukti daugiau studentų, liko neaišku.
7. Vertinimui pateiktoje savianalizės suvestinėje nėra pateikiamas joks savikritiškas požiūris į tai, kas programoje veikia gerai, kas yra tobulintina ir kokių priemonių imamasi situacijai gerinti.
8. Studijų dalykų aprašai savianalizės suvestinės priede yra prastai susisteminti, ypač tiems, kurie nekalba lietuvių kalba.
9. Semestrų pabaigoje studentų teikiamas grįžtamasis ryšys – tik atsitiktinis. Studentai nėra informuojami apie tai, kaip įgyvendinami programos pakeitimai jų pateikto grįžtamojo ryšio pagrindu.

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IV. IŠSKIRTINĖS KOKYBĖS PAVYZDŽIAI

Studijų programa yra orientuota į konkretų darbo rinkos rektorių (žemės ūkio energetikos technologijas), kuris, nors ir siauras, tačiau atitinka Lietuvos kontekstą energetikos

infrastruktūrai plėtoti. Studijų programa puikiai pasiekia tikslą ugdyti studentus būti aktyviais darbo rinkos dalyviais.

Bioenergetikos srities mokymosi ir mokslinių tyrimų ištekliai yra puikūs.

<…>

III. REKOMENDACIJOS

1. Studijų programos pavadinimas – *Energetikos inžinerija*. Pagrindinės dėstomos technologijos daugiausia taikomos agroenergetikos srityje. Ekspertų grupė rekomenduoja išplėsti taikymo sritį orientuojantis į kitus Lietuvos rinkoje plėtojamus energetikos sektorius.

2. Programoje dėstomas platus spektras inžinerinių dalykų, susijusių su energetikos inžinerija žemės ūkio sektoriuje. Ekspertų grupė rekomenduoja gilinti ir plėsti mokymą kompiuterinės analizės ir projektavimo srityse.

3. Reikėtų tobulinti personalo anglų kalbos žinias ir didinti tarptautinius mainus.

4. Reikėtų aktyviau naudotis Moodle platforma ir nuotolinio mokymosi technologijomis.

5. Atsižvelgiant į ankstesnio išorinio vertinimo rekomendacijas, reikėtų daugiau dėmesio skirti aktyvių mokymosi formų taikymui, pavyzdžiui, probleminiam mokymuisi, atitinkamai dėstytojai turėtų būti mokomi ir motyvuojami pastaruosius metodus taikyti.

6. Savianalizės suvestinėje nėra aptariamos studijų programos silpnybės ir jų eliminavimo galimybės, taip pat neaptariama ir kas jau daroma. Ateityje į šią pastabą reikėtų atsižvelgti. Studijų dalykų aprašai taip pat turėtų būti geriau susisteminti, o ne pateikiami ekspertų grupei pagal dalykų pavadinimus lietuvių kalbos abėcėlės tvarka.

7. Studentai turėtų turėti galimybę susipažinti su pakeitimais studijų programoje, kurie yra atliekami jų grįžtamojo ryšio pagrindu.

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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)