STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO
STUDIJŲ PROGRAMOS
ELEKTROS ENERGETIKOS SISTEMOS
(valstybinis kodas - 621H63005)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF *ELECTRICAL POWER SYSTEMS*
(*state code - 621H63005*)
STUDY PROGRAMME
at KAUNAS UNIVERSITY OF TECHNOLOGY

Experts' team:

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Išvados parengtos anglų kalba
Report language – English

Vilnius
2015

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Elektros energetikos sistemos***
Valstybinis kodas	621H63005
Studijų sritis	Technologijos mokslų studijų sritis
Studijų kryptis	Elektronikos ir elektros 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	Elektros inžinerijos magistras
Studijų programos įregistravimo data	2012-02-04, Nr. SV6-7

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	***Electrical Power Systems***
State code	621H63005
Study area	Technological sciences
Study field	Electronics and electrical engineering
Type of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full-time (2 years)
Volume of the study programme in credits	120 ECTS
Degree and (or) professional qualifications awarded	Master of Electrical Engineering
Date of registration of the study programme	February 4, 2012, No. SV6-7

CONTENTS

I. INTRODUCTION

1.1. Background of the 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 20 December 2010 of the Director of the Centre for Quality Assessment in Higher Education (hereafter – SKVC).

The 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 self-evaluation report prepared by Higher Education Institution (hereafter – HEI); 2) visit of the review team at the higher education institution; 3) production of the evaluation report by the review team and its publication; 4) follow-up activities.*

On the basis of external evaluation report of the study programme SKVC takes a decision to accredit study programme either for 6 years or for 3 years. If the programme evaluation is negative such a programme is not accredited.

The programme is **accredited for 6 years** if all evaluation areas are 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 the SKVC. Along with the self-evaluation report and annexes, the following additional documents have been provided by the HEI before, during and/or after the site-visit:

No.	Name of the document

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

The Kaunas University of Technology (KTU) is one of the biggest universities in Lithuania with about 12000 students, 13 faculties and 73 departments. The mission of the university is to provide high level studies and research opportunities at international level

suitable for a sustainable development and growth of the country. KTU is an active member in many international organisations and participates regularly in a variety of scientific research and educational international programmes.

The academic programme under evaluation is Master of Electrical Power Systems (EPS) according to the SER, which is a programme offered by the Faculty of Electrical and Electronics Engineering and supervised by the Department of Electrical Power Systems. The EPS programme is offered in Full-Time mode with duration of 2 year and it is designed with a structure based on the European directives for Higher Education (Bologna Process).

The last assessment of the partly related predecessor programme was carried out by an external international expert team and took place in 2010. A summary of the conclusions of the assessment report is provided in the SER. However, as the present programme is new, the evaluation team considered it as such.

1.4. The Review Team

The review team was completed according *Description of experts' recruitment*, approved by order No. 1-01-151 of Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on *21st October, 2015*.

1. **Prof. Dr. László T. Kóczy (team leader),** *Széchenyi István University and Budapest University of Technology and Economics, Professor, Hungary;*
2. **Prof. Dr. Luis Torres,** *UPC Polytechnic University of Catalonia, Professor, Spain***;**
3. **Prof. Dr. Tilmann Krüger,** *Hochschule Mannheim, University of Applied Sciences, Professor, Germany;*
4. **Mr. Edvardas Linkevičius,** *representative of social partners' at TEO LT, Head of Technology and IT development, Lithuania.*
5. **Mr. Paulius Varonenka,** *students' representative from Vilnius University, Lithuania*.

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The SER gives a very clear and ordered table (2.1) containing the Learning Outcomes (LO) listed according to the following groups: knowledge and understanding, engineering analysis, engineering design investigation capabilities, engineering practice, transferable skills. There are all together 24 concrete learning outcomes listed, which are arranged in accordance with EUR-ACE Framework standards, etc. These Learning Outcomes were updated in 2014. In

Appendix 4.1 there is a correspondence scheme. (cf. also the Table on pp. 10-11) However, we think this high number of LO-s should be reduced. Several LO-s listed one after another may be combined into one compound learning outcome, such as e.g. A1-A3 could be formulated in one (shorter) LO. A total of about 10 Lo-s would be sufficient and more informative and easy to overview.

The programme aims are also clearly set in the SER: to provide deep theoretical knowledge in Electrical Power Systems, to assist with acquiring the main theorems and principles and to develop skills in the selection and combination of technological processes, electrical equipment and systems for maintenance, management and selection skills and the ability to analyse and solve engineering challenges of electric power using mathematical modelling, system analyses and programming techniques, and the development of skills of original design or even scientific research in non-typical situations in the target field.

There is a clear demand for electrical power systems experts presented by the Lithuanian energy market, especially as the EU set the target to produce 33% of renewable sources to produce electricity by 2020. There is a continuous growth of demand for the consumption of electricity both in Lithuania and Europe; and investment activities are also in increase.

It is expected that first of all students with a bachelor degree in Electrical Engineering or Energy Engineering will apply for admission.

The SER lists several strengths of the programme aims and learning outcomes: being in accordance with European and Lithuanian standards and regulatory documents, the demand for the programme by the Lithuanian economy, the flexibility of the programme by the offered elective subjects, wide employment opportunities for graduates by Lithuanian companies. While these are definitely positive elements they are more necessities than points of local excellence.

It is somewhat surprising though that in the SER no weaknesses are recognised at all. (cf. Section 30 of SER) As an unambiguous weakness, in the next section several areas missing from the explicit curriculum will be mentioned and it would be expected that those areas formulated as LO-s would be included in the updated and compressed table of LO-s.

As another major area of weakness will be discussed in Section 2.3 and it reflects the passivity of the staff concerning international mobility and the lack of sufficient high level international publications (cf. the section on staff).

2.2. Curriculum design

According to the SER the Curriculum Design (CD) complies with the national local legislation and the local regulations for the master programmes. More specifically, the total volume of the academic and individual work hours of the study subjects and the respective volume of the individual study subjects conform to the legal acts of the University Academic Regulations. The main characteristics of the academic programme are that the EP-Programme has duration of 2 years (4 semesters) with 120 ECTS, the compulsory subjects do not exceed 5 and the programme foresees 1 thesis project. There are also elective subjects offered by the Faculty of Electrical and Control Engineering and students can take also free electives from their own or other faculties of the university. The number of subjects per semester is 5 making in total 30 ECTS per semester. It awards 30 ECTS per semester and 60 ECTS per year. This is a 2 years master programme with 120 ECTS in total.

From the detailed information about the subjects provided in SER Appendix 4.1 we may verify that the content of the subjects and/or modules are consistent with the type and level of the studies. The subjects cover at a satisfactory level all engineering fields proposed by the programme and include theoretical lectures which account for about 60% of the programme, research and final degree project work which account for about 40%. It is estimated that this distribution of time between theoretical and practical work is appropriate and it is close to the international practice. One minor weakness noted is that in many cases the reference books proposed to some subjects are quite old ones (for example in SER Appendix 4.1 pages 4 (1,2,3), 7 (3,4,5 – it is also questionable whether the majority of students can read in Russian), 8 (1,2,3,4,5 – with only one reference from 2000!) 10 (1,2,3), 14 (all references, are outdated and all are Russian) 17 (all references are old), 30, 31 (all references are from before 2000), 67 (all references are old), 71 (some outdated references), 80 (2-5, partly in Russian)). A renewal of the reference books is proposed in collaboration with the academic staff, especially in the fundamental subjects. The expert team noticed from the SER that some of the lecturers did not renew the course contents in the last 20-30 years. This is why for some subjects' old references dominate and also in additional references Russian language dominates. During the on site visit the evaluation team received some opinion from the teaching staff according to which these areas are classic fields of Electric Power Systems. Although this might be true, it must be stressed that even classic areas have updated and corrected text books published recently, It is recommended that such new editions replace the old references.

In Appendix 4.1 there is a detailed list of the subjects provided with information about the syllabus, the assessment methodology, references and grading system. From the information

given it is estimated that the subjects, contents and methods proposed are suitable for the achievement of the target LO. These facts were confirmed at the on-site visit.

The content of the programme partly reflects the latest achievements in science and power systems related technologies, mostly at a very good level. This has been seen during the visits in the laboratories and confirmed by the employers and alumni during the meetings with them.

Despite the general positive comments it should be remarked that some very up-to-date areas are missing from the curriculum, or at least they do not appear in an explicit way. As two examples, Smart Metering and stability of the energetic network could be mentioned. On the other hand, an M.A. thesis was found and studied on site by the team, that was dealing with stability problems and one of the staff present mentioned about a project including also issues of smart metering, so the basic knowledge needed for the inclusion of such new subjects seems to be available at the department.

2.3. Teaching staff

The staff providing the study programme meets the legal requirements. The composition of the staff consists of 5 professors, 13 associate professors, 4 lecturers with PhD or DSc and only one with MSc, which satisfies the legal requirements. (2.3.1 in SER partly contradicts these numbers.) More specifically, the Order of the Ministry of Education and Science requires that not less than 80% should be holders of doctoral degrees and not less than 20% of subjects from main subject field should be provided by professors. Both criteria are satisfied. It is very positive that all lecturers are in the active age.

From the information provided in the CVs presented in Appendix 4.3, it may be seen that the qualifications of the staff formally conform to the Description of the requirements for Master programmes. The professors and associate professors teaching the main subjects have a professional experience of more than 10 years and all the professors and certain associated professors are involved in the Ph.D. education as well. This shows that the staff qualifications are adequate to ensure successfully the target Learning Outcomes. The team found, however that two aged professors appear in the list of staff seemingly only to ensure the advantageous percentage of full professors as they do not give any lectures (cf. Appendix 4.2). They are still present at the department, their textbooks are in use, so they have an influence on the study process, but very urgently some of the present associate professors should qualify for and apply for full professors' positions.

It should be mentioned also here that the recommended textbooks of several subjects should be replaced by more up to date additions, possibly all in Lithuanian or English language

(avoiding Russian sources, at least among the compulsory literature). Such examples are Energetic Systems Analyses, Reliability and Quality of Power Systems (literarature from before 2000), Modelling of Complex Systems, Active Electrical Networks, Processes of Electrical Distribution Systems and Control, etc.

Further, from the information provided by the staff the contact hours during teaching periods are between 10 and 23 hours per week. This load is rather high and does not provide enough time to staff for research work and publications. This is reflected by the individual list of publications where the majority of articles mentioned are Lithuanian conference proceedings papers. There are some good but local journal articles and several international contributed book studies. We could find only one major international journal paper (such as any IEEE Transactions) in the narrower field of the programme. While attending overseas international conferences might be costly, this is not true for publishing journal papers. The University should provide an environment where staff members have less teaching load and are encouraged to do research with internationally accepted results. Some excelling publications are there in loosely related research areas. Staff should be much more involved in international mobility and cutting edge research efforts. Publications at high level should be strongly promoted. At present high prestige international journal publications are almost completely missing. If possible, it is strongly suggested that the teaching load of the staff would be decreased.

The institution supports the professional development of the teaching staff by organising courses, seminars, and other similar events. From the information provided in the SER it comes out that only 2 members of staff have participated in Erasmus exchanges in 2015, and none in 2013 and 2014. This should be changed and essentially more international study trips should be carried out.

At the meeting with the students we found that the students have a certain impression during the classes that the staff is not experienced enough. Even though this might not be so, this subjective impression might come from the fact that they do not have any important international scientific embedding, nor do they participate in sufficient major industrial/professional projects, and thus a certain lack of confidence in the teaching of areas included in the curriculum. Conversations with several individual teaching staff members have confirmed the feeling that this weakness could be easily overcome by a few additional research projects and industrial contracts, plus some international exchanges of experience as the necessary basic knowledge pool is present.

It is added also that the presence of foreign visiting academic staff is minor (3, 6, 2, 0 in the last four years). It is advised to invite possibly more often visiting lecturers from other

universities or the industry, mainly from abroad, in order to give some specialised courses to students.

2.4. Facilities and learning resources

According to the information provided by the SER and the on-site visit the auditories (12), laboratories (28, 5 of which have been recently renewed and equipped) and computer rooms (equipped with all the necessary licensed software) are adequate in number, size and quality and fully meet the study requirements. It could be mentioned that the Department has a classic high voltage laboratory with all the necessary equipment (fully functioning, as it was demonstrated to the evaluation team). Equipment simulating real life energy network control and dispatching is also available and functional. Some available classic old equipment, such as electric engines are satisfactory even for modern educational purposes. As regards the available software it is good and no special needs have been noted at present. However as the technology in this field changes quickly it is advised to follow up and update the software needs in the next coming years.

The university makes availability for students to use the central library and subsidiary libraries in the Faculties. From the on-site visit it has been seen that the library provides a rich variety of books, textbooks, periodical publications and databases and the electronic catalogues that are also accessible from home. For example the library offers electronic access to some major scientific data bases like Springer Link. Recently the access to IEEE Explorer has been terminated, this should be immediately changed as IEEE Explorer is the most crucial database for Electrical Engineering research and students. It is understood that several Lithuanian higher educational institutes plan to subscribe to IEEE Explorer jointly, which is a rather feasible solution. The number of printed books and periodicals is satisfactory but it could be improved.

As regards the references books proposed to students some of them are quite old. (E.g. some of the books in appendix 4.1 – as it was indicated in 2.2 of this report.). This should be corrected (the books exchanged) because most of the subjects of the programme deal with changing technology. As it was mentioned, a lot of books are in Russian. During the on-site visit, it was noted, that a very small percentage of students understand Russian language.

It could be added finally that students have easy access in printing and copying or scanning facilities as well as in computers rooms with suitable software. During the meeting with students almost all of them expressed their great satisfaction for all the facilities and learning resources they have availability.

2.5. Study process and students‘ performance assessment

The admission requirements to the programme are analytically and clearly explained. The admission regulations for the second cycle programmes are published at the university web-site and the admission assessment is organised according to the students' admission rules and is carried out by the University Selection Committee. The assessment consists of examination of the average mark of the BSc studies with a weight factor 0.8 and the scientific activities of the candidates with a weight factor 0.2. Students should be graduates of Electrical Eng., Electronic Eng., Informatics Eng. or other related area. The ranked competition results are announced in the website of the university.

It can be seen that the admission process applied is transparent and it ensures a high quality of the entrant Bachelor graduates. This is shown in Table 2.5.1 presenting the competition rank of admitted students from 2012 to 2014. Information about the ET programme is presented at the university web page.

The students are satisfied with the study process and their study programme in general. No essential complaints or suggestions for improvement were given regarding the study programme or assessment methods. They are particularly satisfied from the fact that the academic programme is adapted in a way to give them the possibility to work and study at the same time. Although they do not have enough free time because they work, they have easy access to laboratories, computer rooms and libraries during and after university classes.

The students are given the opportunity to take part on research, using the new equipment available at the university, and partly at the collaborating companies. Successful projects are carried out with various Lithuanian companies (AB Lietuvos energija, AB LitGrid, AB Mazeikiu nafta, AB Achema, AB LESTO etc.).

Scientists from the Lithuanian Energetic Institute are invited regularly to deliver lectures and lead degree projects (even as part time lecturers).

The number of Erasmus outgoing students is rather low. (0, 2, 3 in the years 2012-2014, respectively.) Strong efforts should be made to involve students in international mobility programmes and also departmental research projects.

Students' performance assessment is regulated by rules of study module results evaluation. This contains the conditions when additional fees must be paid. More than half of the credits foreseen for a semester must be earned for continuation of the studies in the next semester. M.A. thesis and project report evaluation has been found satisfactory during the on-site visit.

Final theses are defended at the EPS study field qualification committee consisting of 9 members. (Including professors and industrial experts.) The topics of the final degree projects in 2014 and 2015 meet expectations. (C.f. Appendix 4.4, also confirmed by the on-site visit)

2.6. Programme management

The responsibilities for the implementation of the EPSprogramme are clearly described and appropriately allocated. According to information provided by SER the administration of the programme is under the responsibility of the Vice Rector for Studies assisted by the Academic Department. The responsibilities for specific tasks like the innovation and improvement of the programme are given to the Faculty Study Programme Committee (SPC) which consists of 10 members and the chairman is the Dean of the Faculty. The highest Institution of the faculty academic self-governance is the Faculty Council consisting of 17 members. This theoretically includes faculty employees, student and employer‘s representatives. However during the on- site visit it has been seen that students are poorly involved in study programme management. Students and teachers has round tables where students can give feedback about the quality of study programme, however it could not be clarified that any of the students have participated in such meetings, they were simply unaware of these meetings. Students can fill questionaires concerning the quality of subjects after every semester, however students are not keen filling it as they do not think the surveys would influence the study procedure at all.. There is no feedack given about the changes made. The employers mentioned only informal verbal communication concerning curricular changes. Students and social partners should be involved in the programme more intensively. If the social partners could influence the programme management more directly, e.g. by participating in the SPC meetings, it would be possible to directly offer topics for projects, especially M.A. theses for the students.

The members of the council are responsible for the programme organisation. We may conclude finally that the implementation of the programme is under the responsibility of the SPC which collaborates with the University Senate Studies Committee, the Academic Departments and finally with the Faculty Council. We may see that in general the responsibility for the implementation of the programme is given to a variety of bodies which include students and staff. Social partners indicated that informal conversations might lead to smaller changes in the course contents, according to their respective expectations.

According to the information provided by the SER the Document Management System of the University exists for collecting the data and for the management of the study programme. The data collected are mainly related to the final degree projects, statistics for mobility of

students and teachers, student's academic records, etc. These data are analysed and used for quality improvement activities. This data is also available in the university web page.

The system of internal quality assurance the programme is based on the the document entitled "System of Internal Study Quality Assurance (SIQAS)" approved by the university senate in 2004. According to the information provided by the SER the structure of the programme is annually revised and renewed. This is good practice that should be continued. The students may regularly evaluate the performance of the staff and the study modules, however, unfortunately the students have almost no motivation at all in taking part in the evaluation of subjects and staff. This should be changed.

The SPC is improving the quality of the programme using the student's feedback regarding the subjects taught, their teacher's performance and other information about the university. Similarly the opinions of the social partners are also taken in consideration. A more active participation of the employers in the programme design and in the proposal of final projects would be more beneficial for the employability of the graduates.

As mentioned also in 2.5 the number of outgoing Erasmus students is not satisfactory, the number of foreign incoming and outgoing teachers is very low and also there is not enough international collaboration in educational programmes like IP (Intensive programme), Tempus and others. The department should look for international students and introduce teaching courses in English as well.

The same applies for the collaboration in international research projects. It is proposed to improve and increase the overall marketing activities like distribution of printing information leaflets and the participation in international educational fairs. Visits to high-schools where the programme could be explained, might benefit the enrolment of new students in the future

The staff load in the programme is another weak point as it was mentioned previously. The staff is overloaded and has not enough time for professional development. The management committees should consider this problem and ask for more funding for employment of more staff. The situation as it is now strongly affects the professional development of the staff, the performance of their work and the overall quality of the learning outcomes, the study process and the programme management.

III. RECOMMENDATIONS

1. Renew recommended literature lists for all subjects mentioned in 2.2 of this report.
2. Include more up to date technical areas explicitly in the curriculum (smart metering, stability analysis and design).

3. The staff should be much more intensively involved in international, cutting edge research and corresponding publications.

4. Staff mobility should be increased, both for incoming and outgoing staff.

5. Staff teaching load should be decreased to enable more research.

6. Student mobility should be much higher as well.

7. Students and employers (social partners) should be more intensively involved in the Programme management.

8. Social partners should be involved in M.A. thesis project definition and offering practice sites.

9. The marketing activity of the department should be more intensive, involving potential foreign students and thus providing classes in English.

IV. SUMMARY

The programme and the curriculum are in accordance with national and international regulations, is consistent and covers all most important areas of the field, even though several up to date fields are still missing from the explicit curriculum. The number of credits and their respective distribution is fully in accordance with the regulations. While the curriculum is well balanced and covers the most important areas of the field it should be remarked that a several very hot areas, such as smart metering and network stability analysis are missing from the explicit curriculum. The on-site visit showed however that the topic of stability is present in the teaching process, as it appeared as the topic of one of the master theses. It is recommended that these areas be included in the curriculum in the future. Some literature recommended to students is outdated, many items are in Russian. In some cases it could be easily updated, such as the basic textbooks referred to often have a corrected and partly extended new edition, which could substitute the presently recommended old edition. The majority of the students do not speak Russian (well enough), so the Russian literature should be moved to the second section, and the primary literature should consist of only Lithuanian and English sources. A list of recommended updates is given in the detailed report.

The staff has not enough research activity, especially cutting edge international research and corresponding publications are missing. Although there is a certain number of even impact factor journal articles authored by the staff involved, these are essentially Lithuanian publications, and often the articles are in reality (extended) conference papers which had been presented at one of the related annual national conferences (with international character). Participation at major international congresses, such as conferences organised by the IEEE are

almost completely missing, similarly, there are no IEEE Transaction papers authored by any of the staff members. There should be considerably more involvement in international research, including co-authoring papers with foreign researchers in the field. One of the reasons for the lack of cutting edge publications is that there is not enough mobility of both of staff and students, and this is also true for visitors. There are Erasmus mobility opportunities for staff members and KTU staff involved in other programmes does use these mobility funds. In the frame of visits at other European and overseas universities there is usually a possibility to get involved in ongoing research projects, and thus the first steps to really international publications may be done. Similarly, the presence of foreign visitors from high level higher educational institutions might play an important fertilising role in the internationalisation and in the intensification of research. The mobility of students is equally important, because this way they obtain much better foreign language skills, than just by language classes, and so they may interact with teachers and fellow students at foreign universities, and might obtain a broader view of recent professional developments and up to date tendencies. The presence of foreign students is similarly encouraging the staff members to deliver classes in English and thus polish their own language skills and at the same time use the international literature that is sometimes missing in the recommended literature lists.

The learning facilities are adequate, however IEEE explore is missing from the library. The latter is a major drawback that should be soon eliminated. During the past years the IEEE Explorer was available, and stopping the subscription to it brings great disadvantages to both the teaching staff members and the students, especially when they work on their respective projects and theses. It is understood that the subscription to IEEE Explorer is feasible for a consortium of universities, so it is recommended that KTU contact in this matter VGTU, Šiauliai University and Klaipėda University, which are all interested in having this most important source for electrical and electronics engineers available. Other digital data bases are available.

The students and the social partners should be involved much more intensively in the programme management. It would be important that industrial partners, prospective employers and the like be represented in the Study Programme Committee meetings and a formal mechanism be established where suggestion for the inclusion of new up to date fields in the curriculum can be easily managed. The students do not feel a strong enough motivation of participating in the evaluation of classes and teachers and because of this, they very seldomly send a feedback to their teachers that could be later used in the improving of the study programme. The students have no knowledge of any formal participation opportunities in the study programme management, which might be the fault of the insufficient communication with student representatives.

V. GENERAL ASSESSMENT

The study programme Electrical Power Systems (state code – 621H63005) at Kaunas University of Technology is given **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	2
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	3
6.	Programme management	2
	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. Dr. László T. Kóczy
Grupės nariai: Team members:	Prof. Dr. Luis Torres
	Prof. Dr. Tilmann Krüger
	Mr. Edvardas Linkevičius
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KAUNO TECHNOLOGIJOS UNIVERSITETO ANTROSIOS PAKOPOS STUDIJŲ PROGRAMOS *ELEKTROS ENERGETIKOS SISTEMOS* (VALSTYBINIS KODAS – 621H63005) 2015-12-17 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-356 IŠRAŠAS

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa Elektros energetikos sistemos (valstybinis kodas – 621H63005) vertinama **teigiamai**.

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

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

2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)

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

4 - Labai gerai (sritis yra išskirtinė)

<...>

IV. SANTRAUKA

Studijų programa *Elektros energetikos sistemos* ir studijų turinys atitinka nacionalinius bei tarptautinius reglamentus, yra nuoseklūs ir apima visas svarbiausias šios krypties sritis, nors kelios šiuolaikinės sritys dar neįtrauktos į detalų programos turinį. Kreditų skaičius ir paskirstymas visiškai atitinka reglamentus. Nors studijų turinys gerai subalansuotas ir apima pačias svarbiausias programos krypties sritis, reikėtų pastebėti, kad kelios labai aktualios sritys

pavyzdžiui, pažangiosios matavimo sistemos ir tinklo stabilumo analizė, į detalią programą neįtrauktos. Tačiau per vizitą paaiškėjo, kad mokymo procese stabilumo tema nagrinėjama; tai parodė vieno magistro baigiamojo darbo tema. Rekomenduojama ateityje įtraukti minėtas sritis į programą. Kai kuri studentams rekomenduojama literatūra yra pasenusi, daug leidinių yra rusų kalba. Kai kurias knygas būtų galima nesunkiai atnaujinti, pavyzdžiui, dažnai naudojamus pagrindinius vadovėlius, kurie yra seno leidimo, pakeisti pataisytos ir iš dalies papildytos naujos laidos vadovėliais. Daugelis studentų nekalba rusiškai (pakankamai gerai), todėl rusų kalbą reikėtų nustumti į antrąjį planą, o pirmaeilė literatūra turėtų būti lietuviški ir angliški šaltiniai. Rekomenduojamų atnaujinimų sąrašas pateiktas išsamiose vertinimo išvadose.

Dėstytojai nepakankamai dalyvauja mokslinėje veikloje, visų pirma atlieka mažai mokslinių tyrimų ir publikuoja jų rezultatų. Nors dėstytojai ir yra paskelbę kažkiek straipsnių didelį svorį turinčiuose žurnaluose, tai daugiausia lietuviški leidiniai; tikrovėje dažnai šie straipsniai yra (išplėsti) konferencijų dokumentai, kurie buvo pateikti vienoje iš susijusių metinių nacionalinių konferencijų (turinčių tarptautiškumo požymių). Beveik visai nedalyvaujama svarbesniuose tarptautiniuose kongresuose, pavyzdžiui, IEEE organizuojamose konferencijose, dėstytojai nėra publikavę savo straipsnių IEEE tinkle (*IEEE Transaction papers).* Reikėtų daugiau dalyvauti tarptautiniuose moksliniuose tyrimuose, įskaitant bendrus straipsnius su šios srities užsienio tyrėjais. Viena iš priežasčių, kad mažai skelbiama pažangių straipsnių, yra mažas dėstytojų ir studentų judumas. Tą patį galima pasakyti ir apie atvykstančiuosius. Galimybių pagal *Erasmus* judumo programą yra, ir kitų programų dėstytojai pasinaudoja judumui skirtomis lėšomis. Vykstantieji į kitus Europos ar užsienio universitetus dažniausiai turi galimybę dalyvauti vykdomuose mokslinių tyrimų projektuose, ir tai gali būti pirmieji žingsniai link tarptautinių publikacijų. Svarbų vaidmenį tarptautiškumo ir mokslinių tyrimų didinimui galėtų turėti atvykstantieji iš aukšto lygio užsienio aukštųjų mokyklų. Tiek pat svarbus ir studentų judumas, kadangi taip studentai įgyja daug daugiau užsienio kalbų įgūdžių nei kalbų paskaitose; taigi jie gali bendrauti su užsienio universitetų dėstytojais ir studentais bendramoksliais ir plačiau susipažinti su naujausiais pokyčiais profesijos srityje bei naujausiomis tendencijomis. Atvykus užsienio studentams, paskaitos dėstomos anglų kalba; taip tobulėja pačių dėstytojų kalbos įgūdžiai ir kartu naudojamasi tarptautine literatūra, kurios rekomenduojamos literatūros sąrašuose kartais trūksta.

Mokymosi priemonės yra tinkamos, tačiau bibliotekoje nėra galimybės naudotis *IEEE Explorer* duomenų baze. Tai labai svarbus trūkumas, kurį reikėtų nedelsiant pašalinti. Anksčiau *IEEE Explorer* buvo prieinama, jos prenumeratos nutraukimas sukėlė daug nepatogumų dėstytojams ir studentams, ypač jų veiklai, susijusiai su projektais ir baigiamaisiais darbais. Manoma, kad prenumeruoti *IEEE Explorer* įstengia tik universitetų konsorciumas, taigi

rekomenduojama, kad KTU palaikytų ryšius šiuo klausimu su VGTU, Šiaulių universitetu ir Klaipėdos universitetu, kurie (visi) yra suinteresuoti naudotis šiuo elektros ir energetikos inžinieriams svarbiausiu šaltiniu. Kitos skaitmeninės duomenų bazės yra prieinamos.

Studentai ir socialiniai partneriai turėtų daugiau dalyvauti programos vadybos procese. Svarbu, kad pramonės sektoriaus partneriai, galimi darbdaviai ir pan. dalyvautų studijų programos komiteto posėdžiuose ir būtų sukurtas oficialus mechanizmas, padedantis spręsti naujų, šiuolaikinių sričių įtraukimo į programą klausimus. Studentai neturi pakankamai stiprios motyvacijos dalyvauti vertinant paskaitas / seminarus / praktinius užsiėmimus ir dėstytojus ir dėl to labai retai pateikdavo dėstytojams grįžtamąjį ryšį, kuris vėliau būtų panaudotas studijų programos tobulinimo tikslu. Studentai nieko nežino apie galimybę oficialiai dalyvauti studijų programos vadybos procese, ir taip galėjo būti dėl nepakankamo bendravimo su studentų atstovais.

<…>

III. REKOMENDACIJOS

1. Atnaujinti visų šių vertinimo išvadų 2.2 dalyje nurodytų dalykų rekomenduojamos literatūros sąrašus.

2. Įtraukti į programą (studijų turinį) daugiau šiuolaikinių technikos sričių (pažangiąsias matavimo sistemas, (elektros sistemos) stabilumo analizę ir (ręžimų) planavimą).

3. Darbuotojai turėtų daug aktyviau dalyvauti pažangiausiuose tarptautiniuose moksliniuose tyrimuose ir skelbti publikacijas.

4. Reikėtų padidinti darbuotojų judumą – ir atvykimą, ir išvykimą.

5. Reikėtų sumažinti dėstytojų krūvį, kad jie galėtų atlikti daugiau mokslinių tyrimų.

6. Studentų judumas taip pat turėtų būti daug didesnis.

7. Studentai ir darbdaviai (socialiniai partneriai) turėtų būti labiau įtraukiami į programos vadybos procesą.

8. Socialiniai partneriai turėtų dalyvauti apibrėžiant magistro baigiamojo darbo temas ir siūlyti praktikos atlikimo vietas.

9. Katedros veikla, susijusi su rinkodara (reklamavimu), turėtų būti daug intensyvesnė, apimanti galimų studentų iš užsienio pritraukimą, taigi ir paskaitų anglų kalba teikimą.

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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)