STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

PANEVĖŽIO KOLEGIJOS
ELEKTROS IR AUTOMATIKOS ĮRENGINIAI PROGRAMOS (653H62004)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF *ELECTRIC AND AUTOMATIC EQUIPMENT* (653H62004)
STUDY PROGRAMME
At PANEVĖŽYS COLLEGE

Grupės vadovas:
Team leader: Edmund Handschin

Grupės nariai:
Team members: Anne-Marie Jolly Desodt

Juozas Vaitkus

Artūras Klementavičius

Tautvydas Jančis

Išvados parengtos anglų kalba
Report language - English

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	*Elektros ir automatikos įrenginiai*
Valstybinis kodas	653H62004
Studijų sritis	Technologijos mokslai
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programos rūšis	Koleginės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	Nuolatinė (3), ištęstinė (4)
Studijų programos apimtis kreditais	180 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Elektros inžinerijos profesinis bakalauras
Studijų programos įregistravimo data	2009-08-31 Nr. 1-73

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	*Electric and automatic equipment*
State code	653H62004
Study area	Technology science
Study field	Electronics and electrical engineering
Kind of the study programme	College studies
Cycle of studies	First
Study mode (length in years)	Full-time (3), part-time (4)
Scope of the study programme in credits	180 ECTS
Degree and (or) professional qualifications awarded	Professional Bachelor of Electrical Engineering
Date of registration of the study programme	2009-08-31 Nr. 1-73

CONTENTS

I. INTRODUCTION

Panevėžys College (PK) conducts the Electrical and Automatic Engineering Study Programme (EAE) in the Faculty of Business and Technology. Electrical and automatic equipment college studies have started in 2003. The programme was renewed in 2006 conforming to the standard of the general technological science (engineering) study area. Since 2011 the programme has been renewed and reorganized being guided by the European Credit Accumulation and Transference System (ECTS). The external assessment of the programme has never been done so far. The faculties at PK are led by the deans. In each faculty, the main structural unit is the department that conducts the study process; the department is led by head of department, but the administration of the faculty is responsible for the qualitative process of the management of study programmes and the department with programme Committee - for its development, optimization and assurance of study results. Faculty of Business and Technology implements twelve study programmes, EAE is one of them. At PK there is a strategic plan for the activities for 2012-2014. The self analysis report has been elaborated from January to April 2012 by a workgroup. The on-site evaluation was performed by the entire evaluation team on October 3, 2012 according to the following schedule.

09.00 - 09.45 Meeting with Administrative staff
09.45 - 10.30 Meeting with staff responsible for preparation of SER
10:30 – 10.45 Break
10.45 – 11.30 Meeting with teaching staff
11.30 – 12.15 Meeting with students
12.15 –13.00 Observation of various support services (laboratories, teaching spaces, workshops, library, computer services, etc.)
13.00 – 14.00 Lunch
14.00 – 14.45 Familiarization with students' final works and examination material
14.45 - 15.30 Meeting with graduates, employers, and social partners
15.30 – 16:00 Discussions, observation of the visit (close-door experts' group meeting)
16.00 – 16.15 Introduction of general remarks of the visit

The following evaluation report represents the unanimous opinion of the entire team.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

Programme management, teaching and learning outcomes are consistent and well publicly accessible. The outcomes of the EAE study programme have been constantly analyzed and evaluated for the last five years by the Programme Committee. The validity of the study outcomes are methodically evaluated in the department sittings and the Programme Committee meetings, that is, after the completion of the semester and at the end of every academic year having carried out students and lecturers' surveys, employers' interviews, having analyzed the opinion of boards experts. The programme aims and learning outcomes are based on the academic and/or professional requirements, public needs and the needs of the labor market. Panevezys College is the only educational institution training professional bachelors in electricity engineering in the region and around 34 graduates complete the study programme every year. Therefore, the number of specialists is optimal in the region. Currently, it is complicated to estimate the demand for Electrical and Automatic Equipment specialists in the future, since the country‘s macro-economic indicators are negative, however, there are signs that the economy is recovering in the region. The programme aims and learning outcomes are consistent with the type and level of studies and the level of qualifications offered and are discussed with the regional employers of the electricity and automation sector, students practice supervisors from company. The meetings and discussions have been organized and reviewed the study outcomes, updating possibilities, graduates' prospects. The name of the programme, its learning outcomes, content and the qualifications offered are compatible with each other. The aim of the study programme “Electrical and automatic equipment” is to prepare specialists who are capable of implementing, operating and designing electrical and automatic equipment, controlling automatic systems, information sources and managing the public utility energy subdivision. According the study outcomes the graduates has to be ready to plan and design various objects of electricity, control technological processes, applying modern computer equipment, are in charge of safe work organization and work quality. The content of the studies includes the basics of fundamental subjects of technological, social and humanitarian sciences, and the credits of these branches correspond to the legal documents. It corresponds to the requirements of the European qualification the sixth level structure which is characterized by the three outcome types: knowledge, skills and wider competences, defined as personal and professional achievements, but the analysis of the content of Annexes 1 and 6 shows that the studies’ outcomes can not be realized in all declared content due to missing studies of the heat pumps mechanisms, photovoltaic and principles of the different sensors work. Also, the outcome

related to the ability to prepare the strategic and business plans for the company is not enough based on the studies content due to presenting only the main principles of the economy and management. This knowledge is enough for planning of the events, but not the company.

2. Curriculum design

The curriculum design meets all the legal requirements. However it has to be pointed out that the basic courses are not adopted to the studies field and the special courses, e.g., philosophy course consists of very general subjects that are more typical for the university level and there are no links to the engineering profession; the physics subject presents a selected parts of general physics and does not cover the problems related to the study programme, e.g., the basics for electrical phenomena are absent, as well as the principles of thermodynamics and photovoltaic that are important for the renewable sources of energy and the principles of different sensors, are not expanded in the content. The course "Basics of law" does not include a subject of intellectual property. The course "Environmental and industrial safety" does not include the presenting of actions of engineers if an accident happens.

The study subjects are spread evenly, their themes are not repetitive, but the missing subjects in the basic courses, as the mentioned above, create the problems for understanding of the principles of energy sources and sensors applied in the automation equipment. The laboratories offer a large range of practical work, but analysis of the first year of physics laboratory works shows the main attention to the mechanics and hydrodynamics, that does not corresponds the needs of the EAE studies program. The discussion with the new teacher in physics showed that he understood the remarks concerning the required improvement of the laboratory (to increase the thermal and electrical properties measurement, the presentation of physical effects used in the sensors for the automation equipment). In general the content of the subjects and/or modules is consistent with the type and level of the studies. In general there was found good coherence between theoretical and practical knowledge, but it is a lack of content related to the renewable energy sources, especially it to pay attention on last achievements. The lack of English training makes difficulties to reach the international level. The missing of the recommendation to analyze literature sources in English also makes the level of studies lower than it is required for the international level. In general the content and methods of the subjects/modules are appropriate for the achievement of the intended learning outcomes and the scope of the programme is sufficient to ensure the main learning outcomes, but there are a space for improvements, e.g., for the above given remarks, also to pay attention on the problems of the industrial products life cycle and sustainable development. The studies of the most difficult subject (according the students and graduates response) – the automation are closely related to a lack of understanding

of principles of the automation devices and the content of practical training in the laboratory of physics.

3. Staff

The teaching staff meets legal requirements; the staff regularly discusses the studies subjects and plans how to upgrade it if necessary. The qualifications of the teaching staff are adequate to ensure learning outcomes. The qualification is good enough: all of them have the master or equivalent to master degree education, 27% has the doctoral degree, and 4 teachers are also part time doctoral students at technical universities in Lithuania, 52% have the required practical experience in the field of study programme subjects. The number of the teaching staff is adequate to ensure learning outcomes: 12 teachers have the corresponding to EAE programme qualification, eight has the experience in the electrical and electronic engineering. They participate in the qualification renewing events. Teachers´ workload consists of contact and non-contact hours; only it has to be pointed out during the on-site visit that this workload is intense: the contact hours for the docent position is in average 730, for lecturer – 830, and for assistant – 930, correspondingly. This work load creates problems for the teaching staff in the participation in applied research projects. Teaching staff turnover is able to ensure an adequate provision of the study programme: the number of teaching staff was rather stable during the last years, three teachers were invited and one retired. The new teachers are promising, they are doctoral students, and the young teacher in physics is capable to upgrade the physics laboratory to fit to the requirements of studies. The higher education institution creates conditions for the professional development of the teaching staff necessary for the provision of the programme (the participation teachers in the conferences, teachers exchange according the ERASMUS program), but the teaching staff of the programme is weakly involved in research directly related to the study programme being reviewed. Still there are the problems to improve their level and participate in the research or design of new devices or systems that are probably mostly related with rather big amount of contact hours with the students, but also it deals with a low level of mobility to international partners (only 4 teachers that deliver 13 main special subjects in the EAE programme visited foreign partners during last five years), as well as too low level of skills in foreign languages: during the on-site visit the discussion was only going by the help of an interpreter.

4. Facilities and learning resources

Premises are good enough and well suited for the studies, but the studies are going in a few locations. The institution has plans to build a new building but it still is a plans. Learning equipment in the college is quite satisfactory but the complications for the studies exist due to a

necessity to involve into the teaching process the facilities of Center of Kaunas University of Technology where students can get the necessary access to the automation equipment and to achieve necessary knowledge and practical experience in the field of automation. Laboratories of automation are well equipped with *FESTO* equipment and that is good that Kaunas University of Technology Panevezys institute let to use their equipment. Laboratories of electrical equipment should be improved with some high voltage gears because it would be useful practice for students. The higher education institution has adequate arrangements for students' practice: the places for the practice are enough according the presented data in the SER. There are contracts with 22 enterprises in the region that offer the places for the practice and the final work processing. The discussions with the employers during the on-site visit made clear that all of them like the students and some of them stimulate the students to prolong studies for the master degree. The final works that were presented during the visit demonstrated that the students acquire real practice on the working sites. Teaching materials (textbooks, books, periodical publications, databases) are adequate and accessible: the premises in the Business and technology (BT) faculty library is 367 m², including 224 m² allotted for the reading room. Presently, there are 54 working places for students and 19 of them are computerized. A reading room for the staff and individual work is equipped in the library of the BT faculty too. The library staff demonstrated during the visit the teaching materials, gave information about the possibilities to use the databases. During the visit of the laboratories the necessary teaching materials was demonstrated. During the discussion the students stated there are no problems to access to the teaching material via internet and had no remarks concerning the working hours of the library. Learning resources are well complemented including the literature on foreign language, only the use of them is rather limited due to the lack of language skills.

5. Study process and student assessment

Students are encouraged to participate in research, and applied research activities. The higher education institution ensures an adequate level of academic and social support. The admission requirements are evident but as a lowest point number is not settled some students have very low level of knowledge. Teachers of English language and mathematics put a lot of effort during additional hours and consultations for the first semester students to fill their knowledge gaps which they bring from secondary school. The most of students are rather weak that illustrate the competitive score that is very different: a range for the full time studies are between 13.26 and 2.20 for last two years students. The additional contact hours for the student depended of each student individually, according the students and teacher information during the discussion, and some students with low competitive score were studying successfully. The students evaluate, that

the contacts with the teachers and administration is very good and they have no remarks. The organization of the study process ensures an adequate provision of the programme and the achievement of the learning outcomes. Students are sometimes participating in the meetings organized by the staff of the department according their comments and that shows that students are taking responsibility of the quality of this study programme, but most often the department discuss the opinion of students expressed during the discussions with the teachers. They can see from aside what is good and what should be improved in order to take maximum valuable information from different subject and each teacher. The SAR and the discussions during the meeting showed the teachers do not have close partnerships with enterprise, their discussions mostly performs during the discussions about the practice places and the defense of the final works. Therefore they cannot add their current practical experience into the lecture and that is not attractive to students just to listen. Students have opportunities to participate in student mobility programmes, but international mobility of students is low. Only two students went abroad during the last five year period and that is not much. English version of College website is not working properly and hence foreign students cannot get full information about the College. Most of the students who participated in the discussion during the meeting were not self confident about their foreign language skills, and proposed that it would be some actions taken by administrative staff to revise the study programme and add more credits for foreign language skills. The higher education institution ensures an adequate level of academic and social support, possibilities are created to study according the individual programme. All students who apply have their accommodation in the dormitory. There also exists the grant system for the student support, and 24% of EAE program students were supported in 2011-2012 spring semester. The students are encouraged to participate in research, and applied research activities mostly related to the design of different automation systems and devices. They participate in the Controller and a microcontroller application in the study and production student competition in May 2011, the Student scientific society was founded in 2011. Students participate in design of mechatronic devices and participate in the national competitions and the devices were presented during the visit. The study programme is called *Electrical and Automatic Equipment*, but judging from the number of final thesis it appears that students are more interested in electrical part of this study programme and not in automation, because the majority of these final theses presented during the on-site visit were about electrical subjects. In general, final theses are formally written well, but the ratio between electrical and automation thesis number should be equalized. The assessment system of students' performance is clear, adequate and publicly available, the assessment procedure is well defined and students did not have any complains about it. The professional activities of the majority of graduates meet the programme providers' expectations of graduates

and employers, it was explained by the employers during the on-site visit that it is rather common that the final theses corresponds to the real projects that are ready to be implemented.

6. Programme management

Responsibilities for decisions and monitoring of the implementation of the programme are clearly allocated. The detailed analysis of the study process has been performed each half a year, and the decisions of necessary actions or improvements are admitted. The faculty administration is responsible for the study process; the programme committee consisting of the seven persons is responsible for the study process and results control. The control of studies made more evident due to the well documented control of student knowledge and experience. The documents of exams and the laboratory works, practices were presented. Also a series of documents are annually analyzed: student progress, student and teacher mobility, documents of applied scientific research, reports of chairmen of qualification commissions, data on graduate placement (every year); interviews: with applicants – discussion of future studies, with the first year students, - adaptation problems, with supervisors of practical training – results of practical training, with tutors of groups – results of the semester, problems of support to students, etc. (every year). The administration follows the carrier of graduates continually. Every year the incoming recruitment information from the local employment office shows the situation about the *EAE* study programme graduates. The results are not very good because only 74% graduates have a job and 10% are studying at the universities, but the situation is understandable due to the current situation in the labour market. The stakeholders are involved into the study process and outcomes analysis, but it is not regularly and has near to the accidental character, as usually during the practice organization procedure, but the main contribution each year is performed after the defense of all final theses. Based on the discussions with students, graduates and stakeholders it was possible to conclude that the students, graduates and stakeholders evaluate that the studies and outcomes show good results and the administration and teaching staff work stresses on the right direction. The internal quality assurance measures are effective and efficient. The quality assurance system is implemented in the College, and the Quality council, that includes the student and administration representatives, participates in the quality evaluation. Special capacities of administration staff which enable to understand, master and apply the quality management system's mechanisms of assurance and improvement are being developed. The strength in this area is that the responsibilities for the Programme implementation and superintendence are distributed clearly, but social stakeholders not always take part in the Programme assessment and development processes, the internal quality assurance measures are not enough sufficient for whole scale, but performed actions assure the existing of the internal

quality control. In 2011 solutions were made to rearrange the quality management system according to ISO 9001 standard and BMV‘s (CAF) requirements.

III. RECOMMENDATIONS

1. To improve the content of basic courses to the engineering profile and electric and automatic equipment programme, particularly.
2. To increase discussions with stakeholders and achieve the regular discussions concerning the required new trends in studies and outcomes.
3. To create the institution plan to improve the English language skills for teachers and students.
4. To upgrade the special courses to increase the new field of automation and renewable energy subjects.
5. To increase the activity of teachers in the consultations and collaboration with the local companies.
6. To improve Laboratories of electrical equipment with some high voltage gears

IV. SUMMARY

This study programme in electric and automatic equipment is a significant contribution to the growing need for practical engineers in the region of Panevėžys. The programme management and learning outcomes are consistent with the teaching aims. There is a good balance between theoretical and practical knowledge. The study facilities are good and are under constant improvement. The available laboratories offer a large range of practical work. The teachers spend a lot of time with weak students – in particular during the first year of studies - to make their studies successful. During the on-site visit it was made clear to the evaluation team that students, graduates, and employers are satisfied with this study programme. Based on the presented yearly reports and final theses it can be noted that they are of good quality. Each exam is well documented. The college has a good strategy to attract new students. The transition of professional BA graduates into MA programmes at universities works fine.

The actual form of the study programme leaves the following potential for improvements. There is no clear strategy to remove actual weakness in the study programme, e.g., lack of English knowledge is acknowledged but no remedial measure could be presented during the on-site visit to improve this situation. Basic courses have to be improved by including more engineering aspects including intellectual properties. The strategy to support weak students is not sufficiently publicized. The laboratories in the first two years must be improved to adequately acquaint the students with basic phenomena of electrical engineering and automatic control. The internationality and foreign exchange of teachers and students is too low. The teaching staff has not sufficient industrial contacts. The majority of the final theses are dealing with electrical equipment and not automatic control. This imbalance should be removed during the next few years. Female students are underrepresented in the group of students. There is no clear strategy to improve this situation.

V. GENERAL ASSESSMENT

The study programme *Electric and automatic equipment* (state code – 653H62004) of Panevėžys College is given **positive** evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation 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.

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V. APIBENDRINAMASIS ĮVERTINIMAS

Panevėžio kolegijos studijų programa *Elektros ir automatikos įrenginiai* (valstybinis kodas – 653H62004) 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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IV. SANTRAUKA

Elektros ir automatikos įrenginių studijų programa labai atsižvelgiama į didėjantį inžinierių praktikų poreikį Panevėžio regione. Programos vadyba ir numatomi studijų rezultatai atitinka mokymo tikslus. Išlaikyta gera teorinių ir praktinių žinių pusiausvyra. Studijų materialiniai ištekliai geri ir nuolat tobulinami. Esamose laboratorijose galima imtis įvairios praktinės veiklos. Dėstytojai skiria daug laiko silpniems studentams – ypač pirmaisiais studijų metais - siekdami užtikrinti jų studijų sėkmę. Lankydamasi vietoje vertinimo grupė suprato, kad studentai, absolventai ir darbdaviai šia studijų programa patenkinti. Matyti, kad pateiktų kasmetinių ataskaitų ir baigiamųjų darbų kokybė gera. Visi egzaminai gerai dokumentuojami. Kolegija taiko

gerą naujų studentų pritraukimo strategiją. Profesinio Bakalauro studijų programos absolventai lengvai pereina į universitetų Magistro programas.

Toliau nurodyta, kaip būtų galima gerinti dabartinę studijų programą. Nėra aiškios strategijos, kaip šalinti studijų programos trūkumus, pavyzdžiui, pripažįstama, kad trūksta anglų kalbos žinių, bet vizito kolegijoje metu nepasiūlyta priemonių, kaip būtų galima šias žinias gilinti. Reikėtų gerinti pagrindinius kursus: į juos reikėtų įtraukti daugiau inžinerijos aspektų, įskaitant intelektinę nuosavybę. Nepakankamai skelbiama silpnų studentų rėmimo strategija. Reikia gerinti pirmųjų dvejų studijų metų laboratorijas, kad studentai galėtų tinkamai susipažinti su pagrindiniais elektros inžinerijos ir automatinio valdymo reiškiniais. Dėstytojai ir studentai nepakankamai aktyvai dalyvauja užsienio mainų programose. Nepakankamas dėstytojų ir pramonės atstovų bendradarbiavimas. Dauguma baigiamųjų darbų susiję ne su automatiniu valdymu, bet su elektros įranga. Šią pusiausvyrą reikėtų atkurti per artimiausius kelerius metus. Labai mažai studenčių. Nėra aiškios strategijos, kaip didinti jų skaičių.

III. REKOMENDACIJOS

1. Gerinti pagrindinių kursų turinį atsižvelgiant į inžinerijos profilį ir pirmiausia į elektros ir automatikos įrenginių programą.
2. Skatinti diskusijas su socialiniais partneriais ir reguliariai diskutuoti apie reikiamas naujas studijų tendencijas ir rezultatus.
3. Parengti institucijos planą, pagal kurį būtų gerinami dėstytojų ir studentų anglų kalbos įgūdžiai.
4. Atnaujinti specialiuosius kursus siekiant plėsti naują automatikos ir atsinaujinančiosios energijos dalykų sritį.
5. Skatinti dėstytojus aktyviau konsultuotis ir bendradarbiauti su vietos įmonėmis.
6. Gerinti elektros įrenginių laboratorijas įrengiant aukštos įtampos įrenginius.

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