



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

**KAUNO TECHNOLOGIJOS UNIVERSITETO
PANEVĖŽIO INSTITUTO
AUTOMATIKA IR VALDYMAS PROGRAMOS (61201T102
(612H66001))
VERTINIMO IŠVADOS**

**EVALUATION REPORT
OF *AUTOMATION AND CONTROL* (61201T102
(612H66001))
STUDY PROGRAMME
AT KAUNAS UNIVERSITY OF TECHNOLOGY
PANEVEZYS INSTITUTE**

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Automatika ir valdymas</i>
Valstybinis kodas	61201T102 (612H66001)
Studijų sritis	technologiniai mokslai
Studijų kryptis	elektros inžinerija
Studijų programos rūšis	universitetinės studijos
Studijų pakopa	pirmoji
Studijų forma (trukmė metais)	nuolatinė (4), iššęstinė (6)
Studijų programos apimtis kreditais ¹	160
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	elektros inžinerijos bakalauras
Studijų programos įregistravimo data	1997 m. gegužės 19 d. Perregistruota 2001 rugpjūčio 2 d.

¹ – vienas kreditas laikomas lygiu 40 studento darbo valandų

INFORMATION ON EVALUATED STUDY PROGRAMME

Name of the study programme	<i>Automation and control</i>
State code	61201T102 (612H66001)
Study area	technological science
Study field	electrical engineering
Kind of the study programme	university studies
Level of studies	first
Study mode (length in years)	full-time (4), part-time (6)
Scope of the study programme in national credits ¹	160
Degree and (or) professional qualifications awarded	bachelor of Electrical Engineering
Date of registration of the study programme	19 May 1997

¹ – one credit is equal to 40 hours of student work

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Centre for Quality Assessment in Higher Education

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I. INTRODUCTION

The objective of this report is to present the results of external evaluation of bachelor (undergraduate) study program *Automation and control* (61201T102) hosted by the Department of Electrical Engineering, Faculty of Technology at the Panevėžys Institute of Kaunas University of Technology. The Institute is an intellectual center of Panevėžys city and North-Eastern Lithuania.

Automation and Control with a specialization in mechatronics systems was started in 1997. The Programme is assigned to the study field *Electrical Engineering*. The evaluation period covers 5 years, from 2005 to 2009. The preceding external assessment was performed in 2005. The international expert team consisted of Prof. Dr. Edmund Handschin (Germany, team leader), Prof. Dr. Krzysztof Kozlowski (Poland), Prof. Dr. Erkki Lakervi (Finland), Prof. Dr. Tõnu Lehtla (Estonia) and Dr. Arturas Klementavičius (Lithuania).

The information sources for evaluation were:

- the self-assessment report of the programme prepared in June 2010;
- information obtained during the site visit on November 11, 2010.

Thursday, 11 November

10.00 – 10.30 Meeting with faculty administration staff

10.30 – 11.30 Meeting with staff responsible for preparation of SER

11.30 – 11.45 *Break*

11.45 – 12.45 Meeting with teaching staff

12.45 – 13.45 Meeting with students

13.45 – 14.45 *Lunch*

14.45 – 16.00 Visiting auditoriums, libraries, other facilities (studios, teaching spaces, computer services, etc.)

16.00 – 16.30 Familiarizing with students' course and final papers (thesis), examination material

16.30 – 17.15 Meeting with alumni and employers

17.15 – 17.30 Experts private discussion and finalisation of the visit

17.30 – 17.45 Introduction of general remarks of the visit to the university

All decisions concerning the final evaluation report have been taken unanimously by the entire team.

Abbreviations:

SER Self-evaluating report

BA Bachelor

MA Master

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

1.1. Programme demand, purpose and aims

There is an obvious demand of specialists with BA qualification degree in Electrical Engineering in the regional labour market, as the employers and municipality officials pointed to. The Programme was demanded by the applicants, as found from the annual figures of entrance to the Faculty until 2009. With the introduction of student baskets (state-financed places) pursuant to the new Law on Science and Studies (2009), the number of entrants decreased from 25 to 18.

The Programme is not unique in Lithuania. Practically an identical programme of *Automation and control* is hosted in Kaunas University of Technology (with the same entitlement and state code). Two programmes within *Electrical Engineering* are hosted at Šiauliai University and Klaipeda University. The BA programme under consideration is more oriented to mechatronics. The major rationale for this BA programme in Panevėžys rests on regional reasons.

The Programme purpose is in conformity with the mission of KUT (the mission is disclosed in par. 3 of SER). The conformity with University's development strategy/strategic plan is not referred to (in the SER), but as it seems from the meeting with the Faculty administration, that such a conformity exists. The administration pointed to that the Development Strategy for 2010-2012 sets forth the challenges as:

- to propagate innovative technologies, foster the development of the knowledge society (p. 8, 9 of the Strategy);
- the students and the University staff should work in partnership to improve the quality of the student experience, with the students involved in decision making at every level (p.8, 9 of the Strategy);
- to foster the personal and intellectual development of the students so that they could identify, formulate and solve the problems, comprehend the professional and ethical responsibility, deal with their weaknesses, and become well-prepared for their lives beyond the University (p.8, 9 of the Strategy).

Those challenges correspond to purpose of the Programme to prepare a specialist with bachelor's degree capable to operate complicated and computerized automation control systems; to pass knowledge in electronics, information and control technologies, necessary working with complicated and computerized control systems in different areas; to teach graduates how to use

computers and computer devices and modern control technologies for solving concrete tasks and problems (par. 18 of SER). The programme is put up in such a way that academic knowledge, cognitive, practical and transferable skills are enhanced. Adequate laboratory equipment serves for this. All the students have access to acquire some skills during professional practice time in industrial environment (par.22 of SER).

The programme aims are consistent and correlate with programme purpose. Nevertheless, the distinction between programme purpose and aims (in SER) could be expressed in more pronounced way (it concerns paragraphs 18 and 23). Namely, a purpose should be the most general objective of the programme and be expressed in very short description. An aim should be a specific objective of the programme and there should be several aims. The relation between *purpose* and *aim* should be considered as similar to that between *category* and *subcategory*, and *task* and *sub-task*. In the Programme, the purpose is expressed as a set of aims (par. 18) but it should be as that in par. 23 (regretfully, called “aim” instead of “purpose”):

“The aim of Automation and Control study programme is to train wide-profile bachelors in electrical engineering for North-east Lithuania making use of KUT Panevezys Institute pedagogical staff potential”.

1.2. Learning outcomes of the programme

The learning outcomes seem to be appropriate, comprehensible and in conformity with programme aims. The outcomes are grouped into four major categories which are the same for all programmes offered by KUT. The learning outcomes correspond to both general requirements for study programmes and additional specific requirements applied for electrical engineering (01T1) study programmes as set out in the national legal act *General Regulations for Technological Science (Engineering) Studies* (2005). The level of complexity is high; nevertheless the outcomes seem to be attainable. Also the alumni and employers confirmed the acquisition of professional qualification in conformity with learning outcomes during the onsite visit.

The learning outcomes are fairly consistent at a programme level, complementary and without duplications, as it was found out from the alignment of outcomes in Fig. 2 in SER. Learning outcomes of the programme correlate sufficiently with those of the subject level. It was found out after the detailed review of Appendix 4.1 *Description of study subjects* attached to the SER where

- each subject is provided with its learning outcomes grouped in the subsection *Provided knowledge and abilities*.

- linkage of the subject with learning outcomes of the programme is presented in subsection *Learning outcomes for BA degree programme in <name of subject>*.

Nevertheless, it was found that the subject *Basics of Robotics* was not included into the Fig. 2 (p.9-11) of the SER. Therefore it is not clear what learning outcomes are developed by that subject. Also another small inconsistency can be pointed out: SER entitles the four major groups (*Academic knowledge, Cognitive abilities, Practical skills, Transferable skills*) with different names from those used in the Appendix 4.1 (e.g., second group is *Cognitive abilities* in SER but *Intellectual abilities* in the Appendix). Some subjects/modules in Appendix 4.1 are not provided with learning outcomes at a programme level as e.g. *Electrical Materials and Measurements*.

There exists a regular procedure of revision of learning outcomes. The Deming's principle was applied to examine the appropriateness of learning outcomes. When considering a learning outcome, the Department carefully takes into account the demands and suggestions from labour market.

Nevertheless, there are small inconsistencies in linkage between learning outcomes and study programme – the learning outcomes for some subjects in Appendix 4.1 are erroneously linked to other programmes, not to the BA programme in question (Automatics and Control):

- subject *Electrical Power Engineering* has a section *Learning outcomes for BA degree programme in Electrical Engineering* ;
- the subjects *Basics of Ergonomics, and Philosophy* have a section *Learning outcomes for BA degree programme in Electronics Engineering* ;
- the subject *Professional Communication and Language of Speciality* has a section *Learning outcomes for BA degree programme in Civil Engineering*.
-

2. Curriculum design

2.1. Programme structure

The BA programme is structured properly by volume (numbers of credits) for particular subject groups. The simple recounting of subject credits presented in Fig. 3 in the SER confirmed that all compulsory subject groups – general subjects, basic part subjects (and its constituents as subjects in engineering basic, mathematics and physical sciences, subjects of social science), special profession-related subjects and elective subjects – are represented in the programme and their volumes meet the requirements set out in *General technology study field (engineering) regulations* (2005) and *General Requirements for Study Programmes* (2005). The same was found for professional training (practice) and final projects. Nevertheless, the following small inconsistencies were found:

1) The title *Liberal arts and communicative subjects* in Fig. 2 (p. 9), Fig. 3 of SER (standing for subject group *General education subjects*) is confusing as the subjects are not related to arts.

2) Concerning general education subjects, paragraph 19 of *General regulations* (2005) states that “at least one half of the scope of the general education disciplines must comprise fundamental worldview disciplines covering the philosophical and historical background of physical and technological science”. Actually, four credits are dedicated to philosophy and the remaining eight credits – to professional communication and language of speciality, and foreign language alternative (level C1). Hence, two credits are missing for the subject group *Philosophical and historical background of physical and technological science*.

3) The total number of credits in Fig. 3, p. 12 of SER, is wrongly split by semesters for *Mathematics and natural sciences*: 4 (1st semester)+ 8 (2nd)+8 (3rd)+4 (4th) equals 24, not 28 (as it should be);

4) There are ambiguities concerning elective subjects referred to in Fig. 3, paragraph 29 and Fig.2 (p. 14) of the SER: the elective subjects are called optional subjects, and vice versa, but different status of subjects is meant. It should be as follows:

- elective subjects could be those not related to specialization subjects (therefore *Specialization electives* in Fig. 2, p.14 is erroneous); their volume is 8 and semesters 1 and 6 in Fig. 3 and Fig. 2 (p.14);
- optional subjects could be those related to specialization subjects; their volume is 12 for each option and semesters 6 and 7 in Fig. 3 and Fig. 2 (p.14).

Subject volumes presented in Table 3 and *Study module teaching forms* №1 (in Appendix 4.1 *Description of study subjects*) seem to be sufficient to attain the learning outcomes of the programme.

Relations and sequence of subjects is rational. It was found out from:

- Fig. 2.1 *Sequence and inter links of study subjects in the BA programme* where the subjects are set out in semesters;
- *Description of study subjects* (Appendix 4.1 attached to the SER) where a description of each subject (study module) has section *Prerequisites* which lists the preparatory subjects.

Nevertheless, there is a number of small inconsistencies in the Appendix 4.1 and SER:

1) Some subjects are not provided with prerequisites such as e.g. “*Real-Time Control of Processes*”

2) Some subjects are “final” in the programme, but it seems they should be pointed to as prerequisites for other subjects:

- *Engineering materials* is not referred to as prerequisite for any subsequent subject /study module (but it is linked to two subsequent subjects in Fig. 2 , p.14 of SER);
- *Strength of materials* is not referred to as prerequisite for any subsequent subject /study module (but it is linked to *Theoretical mechanics* in Fig. 2 , p.14 of SER);
- *Instrumentation of automations* is not referred to as prerequisite for any subsequent subject /study module (but it is linked to three subsequent subjects in Fig. 2 , p.14 of SER);
- *Logical automatics* is not referred to as prerequisite for any subsequent subject /study module (but it is linked to *Analysis of Reliability of Technical systems* in Fig. 2 , p.14 of SER);
- *Theory of probabilities and statistics* is not referred to as prerequisite for Micro– and Macroeconomics (but it is linked to it in Fig. 2 , p.14 of SER);
- *Theory of Probabilities and statistics* is not linked to *Analysis of Reliability of Technical systems* in Fig. 2 of SER (but it is referred to as prerequisite in Appendix 4.1);

3) Some prerequisites are erroneous as they are not included into the Curriculum of the BA study programme, e.g.:

- prerequisite *Electrical engineering* as pointed to in the modules *Electrical materials and measurement*, *Logical automatics*, *Design of Control Systems of Industrial Equipment* , *Electrical Power Engineering*, *Applied Electronics* – cannot be found as a module neither in Appendix 4.1 nor in Fig. 2 and Fig. 3;
- prerequisite *Electrotechnics* as pointed to in the module *Instrumentation of Automation Systems* – cannot be found as a module neither in Appendix 4.1 nor in Fig. 2 and Fig. 3;
- prerequisite *Electrical actuators* as pointed to in the module *Basics of Robotics* – cannot be found as a module neither in Appendix 4.1 nor in Fig. 2 and Fig. 3;
- prerequisite *Sensors and actuators devices* as pointed to in the module *Programmable Logical Controllers* – cannot be found as a module neither in Appendix 4.1 nor in Fig.2 and Fig.3.

2.2. Programme content

The programme contents cover the subjects that are set out in the relevant legislation. The contents seem to enable the students to attain the learning outcomes specified in that legislation.

The themes of subjects presented in the section *Syllabus* of each subject description (Appendix 4.1 *Description of study subjects* of the SER) were found to be sufficient to attain subject's learning outcomes listed in the section *Provided knowledge and abilities*. The only small inconsistency was that some few subjects were found to refer to old-fashioned literature recommended for students in the section *References* of each subject description, e.g.:

- *Automatic Control Theory* – one title was issued in 1986 and is in Russian (therefore unavailable for most of contemporary students);
- *Electric Drives* – two titles were issued in 1978 and 1986, one of them in Russian;
- *Computer Controlled Systems* – two titles were issued in 1984 and 1992, one of them in Russian.

This inconsistency does not change the general statement as made above on sufficiency of programme content.

It was ascertained that forms and methods of classes are sufficient to attain the learning outcomes. Such a conclusion was drawn from the *Study module teaching forms No1 and No2* (in Appendix 4.1 *Description of study subjects* attached to the SER); section *Structure*, where subjects are split by hours to lectures, practical works, laboratory works and individual works. Nevertheless, there are some inconsistencies in the programme content, e.g.:

– subjects/modules *Technology and Control of Flexible Manufacturing Systems*, *Computer-Aided Design 1*, *Basics of Professional Communication* are erroneously included into Appendix 4.1 – it is not taught at all (as seen from Fig. 2 and Fig. 3 of the SER).

3. Staff

3.1. Staff composition and turnover

The staff is appropriately composed and is capable to pursue the aims and learning outcomes of the BA programme. It was ascertained on the basis of the following facts:

- 1 Qualification of staff is in compliance with the requirement that at least half of the scope of study programme basics and special education section must be taught by lecturers having the position of associate professor or professor (par. 28 of *General Regulations*). It was found from the Appendix 4.2 *List of lecturers* attached to SER. On the other hand, the teachers' abilities in free communication in English or an alternative foreign language should be improved.
- 2 The ratio of teachers to students in different forms of classes is not disclosed in the SER, but after the onsite visit it appears to be acceptable.
- 3 Absolute majority of staff is full-time teachers; there are several persons as visiting teachers.
- 4 According to data obtained during the onsite visit, 22 % of teaching staff (7 teachers from 32) have a total workload exceeding the upper workload limit of 900 h of contact work per year, the biggest one reaches 1118 h.

The technical staff includes 2 lab-assistants and seems to be sufficient to support teaching and research activities.

The turnover situation may be characterized as satisfactory. In the period of 2005-2010 there was a minimal turnover: 6 teachers changed due to objective reasons (retirement). In 2009/2010 a certain number of teachers were subjected to reduction of workload because of the decreased number of students.

3.2. Staff competence

The staff experience is adequate to the BA study programme. Out of 32 teachers engaged in the BA programme, 15 have teaching experience above 10 years, 10 teachers – above 5 years and the rest 7 – below 5 years. (total number of teachers with doctor degree is 16). 9 teachers have participated in training courses both in Lithuania and abroad. In the period of evaluation the teachers published ten textbooks and other methodological aids. All the teachers have pointed to their research topics/interests and respective scientific publications in their CVs (in Appendix 4.3 *Description of lecturers activity*). Majority of them also specified in CVs their participation in research projects. There are two major research topic in the study field:

- 1) micro-electromechanical and nano-engineering technology;
- 2) The analysis of mechatronic and micro-mechatronic system design, modelling, manufacturing and implementation.

Experience of teachers' practical work is good and sufficient to ensure the quality of BA study programme as it was found from the Appendix 4.3 of SER and during the onsite visit. The teachers supervising the practice and practical training of students have appropriate professional experience to ensure the attainment of learning outcomes attributed to practical skills and abilities. Teachers' scope of other activities (as expertise, organization, relations with public institutions and authorities, editing) is wide, as it was found from the paragraph 45 of SER. The coordinator of the study programme is the head of Department of Electrical Engineering assoc. Prof. Dr. J. Valickas. His competence in the field of the study programme (mechatronics and micro-mechanical systems) is solid as well as his managerial competence. His practical experience in manufacturing industry is substantial.

Teachers' professional development proceeded in compliance with the institutional regulations from 2005 (*Rules of qualification development*). Nevertheless, the SER points erroneously to Regulations for the teachers' professional improvement" (Rector's order A-186, 2001/07/10) which is not valid. The teachers are given equal and proper conditions for the professional development. The *Rules of qualification development* provide for a wide range of

alternative methods of professional development and require at least one form to be undertaken by a teacher in 5-year period. All the teachers met such a requirement.

Nevertheless, there are two insufficiencies in the professional development:

- the method of international exchange of teachers is too little applied;
- the regulations and their application do not ensure the improvement of teachers' abilities and skills sufficient to prepare the high-rank scientific papers (with ISI index). The requirement for such papers is new and was introduced in 2009.

4. Facilities and learning resources

4.1. Facilities

Premises for studies within the Faculty of Technologies are adequate in number and in occupancy rates. The technical and hygiene conditions of premises are good. All internal spaces within the buildings have been recently renovated and look up-to-date. Some corridors have decorative elements like stained glasses. The working conditions in Faculty's library, reading room and computer classes were found to be appropriate. During the examination session, the opening hours are prolonged and matched to students' wishes.

Laboratories are adequately equipped and look like modern facilities. Significant investments have been put into modernization of laboratories and some new ones are planned for the near future. Those investments were done mainly by enterprises. Their equipment, appliances and materials seem to be suitable and sufficient to attain learning outcomes of the programme. The computer hardware and software is appropriate. The software is licensed and the number of working places is sufficient.

In the Panevėžys region there are apparently ten small-size business enterprises and five medium and large-size enterprises which need the graduates of the BA programme, majority. They offer professional practical places for students. The department maintains regular contacts with them on issues of practical training. The students get two training supervisors: one from the department and one from the practice hosting company. The quality of places and content of practical activities conform to the aims and learning outcomes of the BA programme, as it was ascertained during the onsite visit.

4.2. Learning resources

The provision with books in the library is good. Only insignificant proportion of books and textbooks recommended for specific subjects as major references are old-fashioned or written in

Russian (unavailable for majority of Lithuanian students). The students pointed to the sufficiency of textbooks. The high-rank periodical publications are accessible in number and their content is in conformity with the learning aims and outcomes. The students and teachers have free access to electronic databases in the Faculty library and in the department hosting the BA study programme.

The examination of contents of methodological publications revealed that they are suitable and adequate to the programme's aims and learning outcomes. This conclusion is also confirmed by the fact that the teachers have published in the period of evaluation (since 2005) nine methodological publications. A considerable part of subject material (contents of their lectures) is accessible in e-format via intranet. Nevertheless, students wish that more subject materials would be offered in e-format.

5. Study process and student assessment

5.1. Student admission

Legal framework in Lithuania

The Common Admission System is performing approximately ten years providing applicants with the possibility to rank their priorities for study programmes in all Lithuanian higher education schools (colleges and universities). The priorities (i.e. study programmes) for partly financed and self-financed admission places were ranked in a single common application in decreasing order. The applicants with higher competition grade won a competition in a priority and entered the respective programme, while the remaining ones were moved down to the competition in the next lower priority (for the next study programme). Since 2009, when the new Law on Studies and Science was promulgated, partly financed places were replaced by state financed places (or so-called study baskets). The total number of offered state-financed places was reduced in comparison to that of partly financed places. Currently, the state-financed places cover a bit more than self-financed places. In a result, the entrance grade for state-financed places increased practically for all study programmes in comparison to former partly financed places.

The Law in question also ruled out the extramural studies and replaced them by extended studies with duration of six years.

Programme in question

The entrance grade, i.e. the minimum requirement for competition grade, was never set for this BA programme. Both before 2009 and after it, there have been no self-financed students in full-time studies. The SER does not provide any data on competition to study programme. In

2004-2008, the admission was 25-29 students, but it dropped to 18 in 2009. The lowest competition grade is periodically fluctuating, but the lowest value was in the last year (4.4 in 2009). The special requirements have never been set for this BA programme.

The Institute, Faculty and department undertake multiple measures to attract schoolchildren to study the BA programme *Automation and Control*. The measures as described in paragraph 71 of SER and specified during the onsite visit deserve a high evaluation (“impressive”). They are well-targeted, regular, persistent and comprehensive. The Faculty endeavours seriously at enhancement of motivation of admitted students to study purposefully and adapt to the programme. The students have very positively assessed the adaptation arrangements from the teachers they have been subjected to, including additional consultancy classes in mathematics (majority of dropped-out students failed in mathematics) and English.

5.2. Study process

The student workload in classes is distributed in compliance with requirement not to overrun the maximal number of subjects (7 per semester) – the largest value of subjects is 6. The students confirmed that the schedule of study classes is acceptable and convenient. The schedule of examination session is also sufficiently even and well designed.

The student progress and drop-out rate are monitored permanently because the drop-out rate of 50% in 2004-2008 is unacceptably high. The monitoring system included motivating meetings with Institute administration, external stakeholders, and leaders of the student union. The teachers endeavoured to counteract the drop-out by appropriate measures but the low competition grades of admitted students (i.e. weak knowledge and skills) were major determinants in the situation. The students rather rarely are involved into joint (commercial) research projects with teachers. One of the reasons was a rather limited number of commercial research projects.

The mobility of teachers (going for teaching/working to foreign university or for internship) is rather low. Consequently, the mobility has insufficient positive influence on the quality of study programme. The visiting teachers from European universities have not participated in the programme. Student mobility is far too small. Students seem to be local minded as they do not expressed their interests to participate in the mobility programme. Nevertheless they acknowledged that teachers are encouraging them to participate. There have been no incoming students as yet.

5.3. Student support

The methods of informing the students on programme issues and its changes perform well. The students confirmed that academic support is consistent and useful. Student counselling on study subjects and various study issues is effective. Counselling is provided as scheduled hours, during individual contact to a teacher at any due time and communicating via e-mail. The students positively appreciate the current possibilities for counselling. Student counselling on career possibilities is also suitable. Teachers present students the career possibilities. The students see the co-operation of teachers and employers and also are counselled by the employers themselves during meetings at university or visits to enterprises. They are aware of good employment possibilities after graduation of programme. By now there was no one case of individual study programme to be designed for *Automation and Control* programme. The students quite positively are assessing the current procedure of retaking the examinations and repeating the subjects. When a student is ill, a teacher makes individual plan to pass tests and exams. The students pointed out that the academic tutors are only nominated entities but practically providing no academic support.

We found out that the psychological, sports, health and cultural support is fair and suitable. The students confirmed such a finding. The administration of Faculty motivates and stimulates the cultural events organized by the student organization PANFISA. The students' cultural events influence on the cultural life of Panevėžys city. The rules of student financial support are comprehensible for students. The major support forms are grants (social scholarships) and benefits (scholarships for good results). Nevertheless, the scholarships are definitely insufficient to meet the students' needs. Provision with dormitories meets the demand for dormitory places.

5.4. Student achievement assessment

The assessment criteria for students' performance seem to be well designed and fairly applied. The calculation of final grade for the subject is settled as accumulation of separate grades for theoretical and practical works multiplied by weighted factors. The proper arrangement of those factors generates proper incentives to focus on the issues that lead to the attainment of learning outcomes. Composition of assessment grade is rational for majority of subjects and ensures comprehensive and impartial assessment. The students confirmed that the publicity of assessment criteria is sufficient and they are aware of them at the beginning each study subject.

When teacher examines a student's written work, he provides a student with the feedback in form of written comments or a dialog. The verbal examinations are also provided with the verbal feedback from teacher to student, including explanatory and additional information related to the matter of examination topics. If it is needed, a teacher sends the explanation of the evaluation individually by e-mail. The students can also ask a teacher to explain the evaluation or to write e-mail to a teacher.

At the end of each semester the teachers present the students' evaluation results and point out the consequences.

The students consider such a feedback as effective measure that helps to study the subsequent subjects and accumulate comprehensive knowledge.

Requirements for final thesis seem to be due and fair. The students assess them as rational and acceptable.

Procedure of final thesis assessment is clearly defined, transparent and consistently applied. Nevertheless, the procedure is rather complicated and not flexible as there is only one day (in June) appointed for the final defence against the assessment committee. Students cannot defend their theses earlier, if they succeed to prepare them before the deadline. Moreover, there has been no one case of redefending a thesis for the better grade (legally, it is provided for).

The topics of final theses are in compliance with the programme aims and learning outcomes. The grades for final thesis seem to correspond to the level of quality of thesis.

5.5. Graduates placement

About 80 % of graduates claimed that they have a job related to their study field.

A part of them (about 30 per cent) continue their studies for the Master degree of Control Engineering.

Only several percents choose the profile not related to the study field.

Both graduates and employers confirmed that graduates start their professional activities with rather good knowledge and abilities and are demanded in the industry.

6. Programme management

6.1. Programme administration

Composition and functions of the programme management cover all the relevant stakeholders (teachers, students, graduate, employers). The management is joint for the programme both in Kaunas (in the Faculty of Electrical and Control Engineering) and Panevėžys

Institute. The qualification and experience of programme coordinator in Panevėžys is sufficient and corresponds to the field of study programme.

Coordination of collegiality with the personal responsibility of stakeholders was found to be acceptable. The co-operation between programme management members and other academic community members is rather clearly described in the SER and KUT documents.

Information about programme monitoring is collected sufficiently.

6.2. Internal quality assurance

Internal quality evaluation proceeds as a regular process. It covers all the relevant issues. Structure of the programme is annually revised and renewed to a non-essential extent. Study programme committee certifies the study subjects renewed by the teachers and divisions on compulsory basis every three years. This internal quality assurance systems seems to be effective.

The evaluations parameters, methods and aids are prepared consistently and seem to be compatible. They are prepared in compliance to the relevant Senate decisions, orders of the rector, regulations and rules, and descriptions of procedures.

Publicity of evaluation process and results is satisfactory.

The evaluation results are used for improvement of study programme to appreciable extent. Quality assessment and improvement procedure seems not to be inefficient in terms of time and costs. The Study Programme Committee is joint for Kaunas and Panevėžys teachers, consequently, it saves time for analysis of deficiencies and cost in the choice of adequate purchases for the improvement of programme quality. The teachers are actively addressing local issues that need improvement in the contents of subject themes, practical works, schedule of classes, composition of subject assessment grade.

Each student (as a stakeholder of the study process) is provided with the possibility to evaluate the quality of teaching and contents of subject. The students are presented the electronic questionnaires on study subjects at the end of the semester. The teachers access the questionnaire results in personal workspace of the academic information system. General results of the questionnaire are discussed at the meetings of dean's office and departments. Those results are available for student union. In general, it seems that such a questioning on subject issues has appreciable effect on teaching quality. Nevertheless, the students who filled in the questionnaires declared that they have no feedback from the Programme management and have not a feeling that their concerns were seriously taken into consideration. The teachers who do not belong to the Study Programme Committee and administration seem to be rather active in evaluating the

study process and generating proposals for colleagues and committee/ administration, as how to improve quality of the process. The external stakeholders are definitely influential for quality evaluation and improvement. Two employers are members of the Study Programme Committee. In general, cooperation with external stakeholders has positive impact for the improving changes of the BA study programme, but some doubts related to employers' intervention to the programme exist: the employers give preference to practical skills rather than to theoretical knowledge and analysis.

III. RECOMMENDATIONS

- 3.1 To develop an integrated pro-active approach aimed at reduction the 50% drop-out rate of students, including activation of academic tutors.
- 3.2 Persistent efforts should be applied to the attraction of applicants to this BA Programme with, at least, the same intensity as by now.
- 3.3 To raise the students' feeling of European dimension in their academic studies and forthcoming professional activities as currently students are mainly local minded people.
- 3.4 The efficiency of the curriculum should be improved towards fostering BA students to continue studies for Master of Science degree as the current percentage of those students is lower (30%) than the target of KTU for 2010 (45%).
- 3.5 To redistribute *General education subjects* by extension of subject group *Philosophical and historical background of physical and technological sciences* by two credits as is set forth in paragraph 19 of the *General Regulations for Technological Science (Engineering) Studies* (2005).
- 3.6 The English knowledge and communicating should be improved for teachers and students.
- 3.7 The department should endeavour to conclude more contracts for research projects with Lithuanian enterprises.
- 3.8 The department should enter the stage of international research and seek partners for joint international projects.
- 3.9 The workload of some teachers should be reduced to normative level (900 h).
- 3.10 Mobility of both teachers and students (in international exchange) is to be increased.
- 3.11 Students who fill in the questionnaires about quality of subject teaching should be given feedback from the Programme management to be ascertained that their concerns have been taken into consideration.

- 3.12 The associate professors should consolidate their efforts to prepare high quality papers (with respect to ISI index) in order to attain professor positions.
- 3.13 The joint efforts and interventions to respective public institutions should be taken with other departments and faculties in order to find measures how to increase the amount of student's scholarship for good results as well as the number of scholarships.

IV. GENERAL ASSESSMENT

The study programme *Automation and control* (state code – 61201T102 (612H66001)) is given **positive** evaluation.

Table. *Study programme assessment in points by evaluation areas.*

No.	Evaluation area	Assessment in points*
1	Programme aims and learning outcomes	3
2	Curriculum design	3
3	Staff	3
4	Facilities and learning resources	3
5	Study process and student assessment (student admission, student support, student achievement assessment)	3
6	Programme management (programme administration, internal quality assurance)	3
	Total:	18

*1 (unsatisfactory) - there are essential shortcomings that must be eliminated

2 (poor) - meets the established minimum requirements, needs improvement

3 (good) - the area develops systematically, has distinctive features

4 (very good) - the area is exceptionally good

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