



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Kauno technikos kolegijos  
***Elektronikos technika* PROGRAMOS (653H61002)**  
**VERTINIMO IŠVADOS**

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**EVALUATION REPORT**  
***Electronic Engineering (653H61002)***  
**STUDY PROGRAMME**  
At Kaunas technical college

Grupės vadovas:  
Team leader:

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Išvados parengtos anglų kalba  
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## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	Elektronikos technika
Valstybinis kodas	653H61002
Studijų sritis	Technologijos mokslų studijų sritis
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programos rūšis	Koleginės studijos
Studijų pakopa	Pirmoji pakopa
Studijų forma (trukmė metais)	Nuolatinė (3,5) Iššęstinė (4)
Studijų programos apimtis kreditais	120 (180 ECTS)
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Elektronikos inžinerijos profesinis bakalauras
Studijų programos įregistravimo data	30-08-2002

## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	Electronic Engineering
State code	653H61002
Study area	Technological sciences
Study field	Electronics and electrical engineering
Kind of the study programme	College studies
Cycle of studies	First study cycle
Study mode (length in years)	Full-time (3), since 2012- part-time (4)
Scope of the study programme in credits	120 (180 ECTS)
Degree and (or) professional qualifications awarded	Professional Bachelor in Electronic Engineering
Date of registration of the study programme	30-08-2002

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The Centre for Quality Assessment in Higher Education

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## I. INTRODUCTION

The Study Program Electronic Engineering is offered by the Kaunas University of Applied Sciences with 3 specializations: Maintenance of Building Automation Systems, Automated Process Control and Design and Manufacturing of Electronic Equipment (offered since 2012). It is expected by the University that the specializations offered in the frames of the Study Program will be marketable and ensure better option possibilities in comparison to the previous edition of the Study Program. Since 2006 the Study Program has been revised 3 times in attempt to better meet the demands of the labor market.

External evaluation of the Kaunas College Study Program in Electronic Engineering has been conducted by an international expert group consisting of Prof. Dr. Toomas Rang (group leader), Prof. Dr.-Eng. Tilmann Krueger, Doc. Dr. Sergey Olegovich Shaposhnikov, Prof. Dr. Dangirutis Navikas and Monika Simaškaitė (student) through analysis of the self-evaluation report and meetings with the administrative staff of the Faculty, the group of preparation of the self-evaluation report, teaching staff of the Study Program, students of the Study Program and graduates, and their employers.

The expert group has analyzed the Study Program aims and learning outcomes, curriculum of the Study Program, quality assurance (management) of the Study Program, study process, staff and other factors. It has to be pointed that the Kaunas College has close relations with the industry and other institutions of the Kaunas region and is important for preparation of high qualification specialists for both the regional and national needs.

## II. STUDY PROGRAMME ANALYSIS

### *1. Study Program aims and learning outcomes*

The Study Program aims and learning outcomes are well defined and clear. They were updated in 2012 and the new version was approved by the Academic Council decision No. V18-33 of 06 March, 2012. Information about the Study Program and its learning outcomes is publicly accessible and presented in the university website and "AIKOS" information system, the contracting authority of which is the Ministry of Education and Science of the Republic of Lithuania. The summarized information about the Study Program is also presented in the website of the Higher Education Support Mobility Fund, which is the administrator of Euro guidance project in Lithuania. Information about the Study Program, its aims and purpose is also yearly presented at the higher education institution fairs.

The Study Program aims and learning outcomes are based on the academic and professional requirements, public needs and the needs of the labour market which is proved by employers' survey carried out by the University in 2011. The survey results showed that currently the university graduates who completed the Study Program in Electronic Engineering work according to their specialty, and more than 80% of managers answered that they are satisfied with the qualification of electronic engineering specialists.

According to the §9 of the Self-Assessment Report the assessment team came to the opinion that the Study Program aims and learning outcomes are consistent with the type and level of studies (first cycle) and the level of qualifications offered (Professional Bachelor in Electronic Engineering) and they are in line with the guidelines for the Level 6 of the European Qualifications Framework. They also correspond to the aims, goals, activity areas and types, defined in the Statute of the University. The name of the Study Program is quite clear for the labour market; it corresponds to the field of studies and needs of industry. The name, expected learning outcomes, and content are compatible with each other. The awarded Professional Bachelor degree in Electronic Engineering also corresponds to the field and level of studies.

## ***2. Curriculum design***

To the assessment team opinion, the Study Program curriculum design meets the legal requirements. Development of the Study Program in Electronic Engineering is based on the order of the Minister of Education and Science of the Republic of Lithuania “On Approval of the Descriptor of Study Cycles” (No. V-2212; November 21, 2011). The full time studies take 3 years, the scope of the Study Program is 180 credits ECTS. In full time studies the student workload per week is 40 hours, 30 hours of which are appointed to lectures, practical training and tutorials (contact hours) and 10 hours for the individual tasks. The curriculum has a logical structure. The study courses of the Study Program are spread evenly; the courses’ names are not repetitive. The minimal workload of one course is 3 credits ECTS. Not more than 7 courses are taught per semester including practical training on the courses chosen.

The content of the Study Program courses enables students to acquire sufficient knowledge in mathematics, physical and technological sciences, and abilities for engineering activity, as well as the application of technologies. Studies in the frames of the Study Program are more focused on the application of technologies and scientific knowledge, than the development of new knowledge which corresponds with the type and level of studies. The study courses expected learning outcomes are achieved through different methods of teaching and studying such as lectures, observation classes, demonstration classes, problem-based learning, engineering design, laboratory works as well as individual tasks and students’ achievement assessment methods, such as report presentation and defense of laboratory/individual tasks (formative assessment) and written examination (summative assessment). During the formal lectures, observation and demonstration classes, tutorials students acquire theoretical knowledge which is solidified through practical classes, while carrying out practical and laboratory works, course papers and individual work. As the Self-Assessment Report shows (§41) “The distribution of contact hours in the study context is as follows: lectures comprise about 31%, practical training – 37%, tutorials – 10%, preparation of course paper – 1%, practice – 21% of the contact study time.”

The Study Program curriculum is constructed of four parts: general courses, core and compulsory courses, specialization courses and optional courses. The part of the general courses comprises 15 credits ECTS, more than half of the credits comprises fundamental courses (9 credits ECTS), and the other part is allocated to social and humanitarian studies (6 credits). The core and compulsory courses comprise 141 credits ECTS. This part includes the theoretical fundamentals of engineering (15 credits), basic engineering courses (63 credits), social science courses (6 credits), selected specialization courses (18 credits), practical training (30 credits), and preparation of the graduation thesis (9 credits). The specialization courses are 15 credits, and optional courses are 9 credits ECTS. The above mentioned figures make it possible to conclude that the scope of the Study Program is sufficient to ensure the expected learning outcomes.

Generally, the content of the Study Program and its courses reflects the latest achievements in applied science, engineering practice and technology. The content of some courses is related to the multi-disciplinary practical learning center of technologies, currently being established at the university and dealing with the achievements of most modern technologies.

## ***3. Teaching staff***

The teaching staff of the Study Program meets the legal requirements. All Teachers are employed by open competition. The Study Program courses are taught by 27 teachers, 24 (88, 9%) of them are employed full-time and 3 (11.1%) are employed part-time. The qualifications of the teaching staff are adequate to ensure achievement of the Study Program learning outcomes. 26 teachers have the Master’s Degree, corresponding to the field of the Study Program. 5 teachers (29,4%) employed full-time and 2 part-time teachers have doctoral degrees. This comprises 35% of teachers teaching the Study Program fundamentals which corresponds to the General Regulation of Technology (Engineering) Sciences, paragraph 28. The fundamental

courses of the Study Program in Electronic Engineering are taught by 11 teachers (55%) who have no shorter than 3 years of practical experience in the field of the Study Program.

To the assessment team opinion, the number of the teaching staff is adequate to ensure achievement of the Study Program learning outcomes. Most courses are taught by teachers with full-time teaching positions. The turnover of teaching staff during the period under assessment was insignificant. The retired teachers and those whose labor contract had ended were replaced by young teachers with the necessary level of professional and pedagogical knowledge.

The evaluation and improvement of the teaching staff qualification is based on the University pedagogical staff qualification improvement regulations. Teachers' professional development is organized by the Qualification Improvement Centre of the University which is coordinated by the assistant director for academic work. Figures presented in the self-assessment report show those teachers professional development activities are carried out on a regular basis. The teaching staff of the Study Program is also encouraged to participate in the methodical work. In 2007, 4 methodical publications were issued, in 2008 – 14, in 2009 – 7, in 2010 – 9 and in 2011 – 9. Most of these methodical works are published in e – medium CD format.. The total of publications during the evaluative period reaches 43. The average amount of publications for one teacher of the Study Program is 1.6. During the period of 2006-2008 twelve teachers of the Study Program participated in the project “Practical Teaching of New Technologies in the Electronic and Electrical Engineering field of Studies: Implementation of Simulative Practical Skill Formation Model” (SFMIS Nr. BPD 2004-ESF-2.4.003-05/0146).

The teaching staff of the Study Program is involved in applied research and development projects related to the Study Program field. Most of teachers publish results of their research in peer-reviewed magazines and as proceedings of conferences. Teachers are also involved in research on the methodology of teaching.

#### ***4. Facilities and learning resources***

The University premises for studies are adequate both in their size and quality. All the premises are kept neat and clean, most of them are renovated. The teaching and learning equipment of the Study Program including technical facilities of laboratories are adequate both in size and quality though the Study Program management considers it as a weakness of the Study Program. Some laboratory equipment was donated by industrial partners. The study labs are clearly focused to the courses they have to support, but the equipment must be modernized and the task-boards upgraded (here the role of interested industry should be increased). There is a laboratory facilities development plan, and certain steps are taken in its implementation. The technological and final practices of students take place in companies. For this purpose, cooperation agreements were signed with a certain number of electronics companies. The University participates in the ERASMUS mobility stimulating Study Program and students have the possibility to have the internship practice abroad.

Teaching materials of the Study Program are adequate and accessible. The necessary information sources for studies including full-text on-line databases are available at the University library and reading-room. A good number of methodical materials is prepared and published by teachers of the Study Program. The University has a cooperation agreement with the Kaunas University of Technology which provides a possibility to make use of its library and reading-room services. The cooperation agreement is also signed with the Kaunas District Public Library which makes possible to order publications through the interlibrary exchange system.

## ***5. Study process and students' performance assessment***

The admission requirements are well-founded and based on the Ministerial regulations. The admission to the Study Program is conducted on the basis of the Law on Studies of the Republic of Lithuania, the Order of the Minister of Education and Science of the Republic of Lithuania "On Determination of Learning Result Minimal Indexes for Persons Claiming the State Financed Position in the First Study Cycle and Integrated Studies" and the Order of the Minister of Education and Science of the Republic of Lithuania "On the Description of Best-performing Secondary Fostering Graduates Ranking Order". In conformity with these acts, the admission to the Study Program in Electronic Engineering is carried out in two ways: during the general admission to all Lithuanian higher educational institutions and the admission to the vacant fee-paying study places.

To the opinion of the assessment team, organization of the study process in the frames of the Study Program ensures an adequate provision of the Study Program and the achievement of the expected learning outcomes. The studies timetable includes up to 8 academic hours for contact work per day. The number of courses per semester cannot exceed 7, including practical training. The examination session lasts 2 weeks. The examinations are distributed evenly during the whole session time, including tutorials. One examination may be taken per day. The heads of academic groups agree upon the examination time and date with teachers by filling in the appropriate form and submitting it to the Faculty dean's office. The form, revised and approved by the dean's representative is submitted to the Department of Studies. However, during the analyzed period the drop-out numbers were quite high. The percentage of students who successfully graduated from the Study Program was: in 2009 – 36.7%, in 2010 – 43.3% and in 2011 – 45.2%. Since the biggest part of expelled students is the first year students, the University pays special attention to them. Seeking to help students to better adapt at the University, the study course "Introduction to Studies" was developed which introduces the first-year students with the University activity regulating documents and the study order.

Students together with teachers are encouraged to take part in applied research related to industry and the university needs and problems. As a result, some students' graduation these were the basis for the development of various laboratory models and equipment. Students, supervised by their teachers, are also encouraged to participate in various scientific events (conferences, contests, etc.) and professional contests of the country. One of such events is the National Mechatronics contest where the University students often take prize-winning places (e.g. in 2009 the second place was won, in 2010 the third place was won. In 2009, the second place was taken at the republican contest "Application of Controllers and Microcontrollers in Studies and Manufacturing". In 2011, at the contest of students' ideas, organized by the Science and Technology Park "Technopolis" and Kaunas municipality, the University team won the third place.)

Students of the Study Program have opportunities to participate in student mobility Study Programs. In 2009 – 2012, 3 students participated in the Erasmus internship practice mobility projects and had 3 month duration placements at the enterprises of Great Britain, Holland and Austria. Students also participate in the cognitive practice exchange in accordance to the agreement between the University and Schmalkalden University of Applied Sciences, Germany. During the period analyzed 10 students had the cognitive practice at Schmalkalden University of Applied Sciences.

The University ensures an adequate level of academic and social support. The University student support system is functioning. All applicable to students' orders and regulations, assessment requirements and examples of cover pages can be accessed by students from the University Intranet. E-access to the Study Program modules methodological material is available through the websites <http://rapolas.ktk.lt> and <http://ktk.moodle.liedm.lt>. Every year, the Career Days are organized at the University in which students can learn about the electronic engineering enterprises of the region and get advice on finding places for practical training and work. Possibilities for studies according to the individual study plan are provided for students with

good academic performance or in special circumstances. All students applying for accommodation are provided with the living space in the university dormitory.

The students' performance assessment system is clear, adequate and publicly available. Before starting the studies of a particular course, students are introduced to the methodology of assessment of their tests, practical tasks, individual tasks, course papers and examinations developed by the University teachers. For the assessment of students' academic achievements the ten point evaluation system has been applied. The assessment criteria are presented in methodological packages and compendiums. The assessment frequency of tests (formative assessment) and individual tasks are indicated in the course unit study plans.

Professional activities of the Study Program graduates meet the Study Program providers' expectations. The Study Program alumni careers are monitored and data on the graduates' employment is gathered and registered twice (October 15 and April 15 after the graduation). Data are collected through phone interviews and questionnaires. According to data presented by the Study Program management, in 2011 the overall graduate employment rate was 85.71%, the ratio of employment according to the specialty was 78.57%. Meeting of the assessment team showed that most graduates are satisfied with the study's results and job opportunities. Some graduates continue their studies at the Master level or are in the process of studying the bridging courses necessary for studies at the Master level Study Program.

## ***6. Study Program management***

The University subdivision functions and responsibilities are determined in the subdivision performance regulations, which were approved by the Director's Order No. V1-95 on the 29th of December 2004. The functions of the Study Program committee are clearly defined in the University Description on the Study Programs management order. The Study Program committee includes representatives of students and social partners. Responsibilities of the Study Program committee members are clearly allocated. The assessment team at the meeting with the teaching staff got the impression that teachers were well informed about the evaluation process and seemed to be involved properly to the preparation of self-assessment report.

The process of regular collecting and analyzing information and data on the implementation of the Study Program is regulated by documents of the Quality Management system. Students' opinion on the quality of studies is collected regularly whereas meeting with teachers showed that feedback from them is not always collected regularly. The outcomes of the Study Program evaluations are used for its improvement. The key stakeholders (e.g. students) are informed on the measures taken for the Study Program improvement or can have access to this information.

The evaluation and improvement processes involve the main stakeholders (e.g. students, employers). Feedback from them is collected and analyzed; their representatives take part in making decisions on the Study Program improvement. However, teachers of the Study Program should be more systematically involved in the evaluation and improvement processes. The assessment team also noted that decisions taken by the Study Program committee are only accessible by students by their request which, to the team members' opinion, does not meet the principle of total awareness of all stakeholders.

The quality assurance process for the Study Program in Electronic Engineering is integrated into the study management procedure PR 7.5-01 "Study Management" according to the ISO 9001:2008/LST EN ISO 9001/2008 management standard and is reflected in the organizational, executive and regulative documents of the Study Program administration. The internal quality assurance system measures are well documented; their results are satisfactory though more active and regular involvement of teachers (e.g. collecting feedback from them) in the Study Program improvement process is needed. Some teachers showed quite vague understanding of the role of the Quality Management system in the process of the Study Program continuous improvement.

### III. RECOMMENDATIONS

3.1. More active measures are needed for long term planning activities like the development plan of study labs, staff development plan together with the individual carrier development model for the teaching staff, etc.

3.2. The regularity of bilateral meetings and discussions of the college leadership with the representatives from the employer's side seems to be underdeveloped and should be improved.

3.3. More active measures should be taken by the Study Program management on cooperation with industrial enterprises concerning students' practical training as well as the Study Program laboratory facilities updating.

3.4. The students' and staff international mobility seems to be quite low and special steps should be introduced to improve the situation in international cooperation.

## IV. SUMMARY

### **1. Study Program aims and learning outcomes**

#### *Positive quality aspects*

- Kaunas University of Applied Engineering Sciences is the only educational institution in the region training the fourth skill level engineering specialists.
- The study aims and learning outcomes of the present Study Program edition are framed in accordance to the provisions of Dublin descriptors and other international recommendations and guidelines in the field of the higher education including studies in engineering.
- In 2012, 4 optional courses related to Business Economics and Management (Global Quality Management; Project Management; Personal Career Management; Marketing) were introduced to ensure achievement of the general competences of graduates.

#### *Negative quality aspects*

- No analysis of the Study Program weaknesses was carried out by the Study Program management though students and graduates expressed their opinion on the not sufficient achievement of competences in engineering project management (including economic issues) and entrepreneurship.

### **2. Curriculum design**

#### *Positive quality aspects*

- The 2012 version of the Study Program is based on the ECTS regulations and it comprehensively covers the electronics sector specializations.

### **3. Teaching staff**

#### *Positive quality aspects*

- 26% teachers of the Study Program in Electronic Engineering have a Doctoral degree and are involved in teaching 33% of the core and compulsory courses.
- The fundamentals of the study field are taught by 11 (55%) teachers with no shorter than 3 years practical work experience related to the study field.
- Teachers actively develop and publish methodological works.

#### *Negative quality aspects*

- Relatively low involvement of teachers in the international co-operation projects (both on the methodology of teaching and research)

#### **4. Facilities and learning resources**

- *Positive quality aspects*
- The study labs are clearly focused to the courses they have to support.
- The study premises are mostly renovated, they are kept neat and clean.

##### *Negative quality aspects*

- Lack of modern laboratory equipment for some courses (e.g. in the Electronics and Radio measurement classrooms the analogue measurement devices are used).

#### **5. Study process and students 'performance assessment**

##### *Positive quality aspects*

- The study and student achievement assessment methods are clearly defined.
- The virtual learning environment Moodle (<http://ktk.moodle.liedm.lt/>) is used.
- The technological and final practices are organized at enterprises. They are supervised by the specialists with good industrial experience.
- Academic and social support for students is well organized The University provides favorable conditions for the participation of students in applied research, artistic and sports activities

##### *Negative quality aspects*

- Quite high student drop-out rate, especially during the first year of studies.

#### **6. Study Program management**

##### *Positive quality aspects*

- The approach to the Study Program quality assurance is quite sound, it is well documented.
- The staff was well informed about the Study Program evaluation process and seemed to be involved properly to the preparation of the self-assessment report.

##### *Negative quality aspects*

- The deployment of the quality assurance needs better awareness of all stakeholders of the Study Program.
- There is lack of long term planning activities like the development plan of study labs, staff development plan together with the individual carrier development model for the teaching staff, and etc.

- The regularity of bilateral meetings and discussions of the college leadership with the representatives from the employer's side seems to be underdeveloped and should be improved.
- The students' and staff international mobility seems to be extremely low and special steps should be introduced to improve the situation in international cooperation.

## V. GENERAL ASSESSMENT

The Study Program Electronic Engineering (state code – 653H61002) of Kaunas technical college is given **positive** evaluation.

*Study Program assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation Area in Points*
1.	Program 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.	Program management	3
	<b>Total:</b>	<b>18</b>

\*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.