



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus kolegijos

*Elektronikos technika* **PROGRAMMEOS (653H61001)**

**VERTINIMO IŠVADOS**

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**EVALUATION REPORT**  
**OF Electronics Engineering (653H61001)**  
**STUDY PROGRAMMEME**  
At Vilnius College

Grupės vadovas:  
Team leader:

Prof. Dr. Toomas Rang

Grupės nariai:  
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Išvados parengtos anglų kalba  
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## DUOMENYS APIE ĮVERTINTĄ PROGRAMMĘ

Studijų programės pavadinimas	<i>Elektronikos technika</i>
Valstybinis kodas	653H61001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programės rūšis	Koleginės studijos
Studijų pakopa	1 – oji pakopa
Studijų forma (trukmė metais)	Nuolatinė (3,5), iššęstinė (4,5)
Studijų programės apimtis kreditais	210
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Elektronikos inžinerijos profesinis bakalauras
Studijų programės įregistravimo data	2007-07-04

## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Electronics Engineering</i>
State code	653H61001
Study area	Technological science
Study field	Electronics and Electrical Engineering
Kind of the study programme	College studies
Cycle of studies	1 <sup>st</sup> cycle
Study mode (length in years)	Full time studies - 3.5 Part-time studies 4.5
Scope of the study programme in credits	210
Degree and (or) professional qualifications awarded	Professional Bachelor's degree in Electronic Engineering
Date of registration of the study programme	2007-07-04

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## I. INTRODUCTION

- a. Professional bachelor degree studies in Electronics Engineering have been carried out many years as Study Programme with code 65301T205). The new Study Programme for Electronics Engineering (code 653H61001) is organised using seven semesters (3.5 years) for full-time students and nine semesters (4,5 years) for part-time students with 210 ECTS credits. It was prepared in 2007 and started with the autumn semester on 01 September 2008.

External evaluation of this Vilnius College (further on called VIKO) Study Programme has been conducted by an international expert group consisting of Prof. Dr. Toomas Rang as team leader, Prof. Dr. Dangirutis Navikas, ass. Prof. Dr. Sergey Shaposhnikov, Prof. Dr.-Eng. Tilmann Krueger and student Monika Simaškaitė through analysis of the self-evaluation report, meetings with the administrative staff of the responsible Faculty of Electronics and Informatics, the group of preparation of the self-evaluation report, the teaching staff of this Study Programme, students, graduates and employers of graduates as well as through visiting the auditoriums and laboratories related to the modules of this Study Programme.

The expert group has analysed the Study Programme aims and learning outcomes, the curriculum design, the teaching staff, the facilities and learning resources, the study process and students' performance assessment and the Study Programme management. VIKO has defined its mission as to prepare the students to become specialists oriented towards practical activities, meeting the economic and social needs of the Vilnius region and whole Lithuania. Students, alumni and industry support this mission. One of the most important aims of the present evaluations was to assess the changes made to the previous Study Programme. The new design of the Study Programme has allowed broadening the practical exercises, but students, alumni and industry would like to accentuate the practical components of the Study Programme even further. On the other hand the additional semester has also allowed following the changes of legislative rules and laws without confinement of technical courses. The higher number of ECTS credits should get taken into account by the universities for admission to their master Study Programmes.

## II. STUDY PROGRAMME ANALYSIS

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

The Study Programme aims and learning outcomes are well defined, clear and publicly accessible, also in English language. The Study Programme aims and learning outcomes are based on the professional requirements, public needs and the needs of the labour market. High value was set on balanced efforts for a well taught theoretical base in tight connection with laboratories to achieve also more practical skills. A significant part of the practice courses is done in companies and supervised by staff of VIKO. For a final verification of the achieved learning outcomes of this Study Programme the experts have taken the relevant information from the previous Study Programme and combined it with the expectancy based on the differences of both Study Programmes. Employers and graduates have confirmed in unison that their wishes for more practice have been reflected and the Study Programme aims and learning outcomes set the

right base for the requirements of the market. Both sides would like to see even more practice in the Study Programme. The Study Programme aims and learning outcomes are consistent with the type and level of studies and the level of qualifications offered. The study courses are in accordance with the Study Programme aims and the specified level of qualifications.

The name of the Study Programme *Electronics Engineering*, its learning outcomes, content and the qualifications offered are compatible with each other. Electronics are seen as application-oriented systems containing hardware used in a wide range of complexity and applications. One important example is computer systems consisting of hardware and software in complex environments.

## **2. Curriculum design**

As far as the experts could evaluate from presented materials, the curriculum design meets the legal requirements for bachelor Study Programs. The study courses and/or modules are spread evenly, their themes are not repetitive. There is a logical sequence of courses, e.g. a chain based on mathematics via intermediate courses like signals to the courses of higher level like microprocessors and controllers. The content and methods of the courses are appropriate for the achievement of the intended learning outcomes. Special attention was also given to the contents of basic courses. For example the module English is generally oriented on English language but on a big scale uses words and paraphrases belonging to the electronics engineering world. The students have confirmed that they get all required info of taught courses, the questions get always answered and the teachers are very helpful – not only, but especially concerning Mathematics and Physics in the first semester.

The experts agree that the scope of the Study Programme is sufficient to ensure learning outcomes. This has been confirmed by the students and the employers. The range of the Study Programme builds a wide base for business work due to a wide spectrum of jobs related to electronics. The content of the Study Programme reflects the latest achievements in science and technologies due to high investments in the last years, gifts from third parties, proposals from social partners and efforts of the staff. Major weight is laid on knowledge and methods of applied sciences and practical engineering. The content and methods of the courses are appropriate for the achievement of the intended learning outcomes. The methods include presentations of lessons, mostly with PowerPoint, and a high content of practical tasks performed in smaller groups related to the number of places in the laboratories, usually one or two students per hardware set. In many laboratories the students are allowed to use their own notebook.

## **3. Teaching staff**

The teaching-staff looks very motivated, but the clear staff development plan seems to be weakly elaborated. As far as it could be evaluated by the expert group the Study Programme provided by the staff is meeting legal requirements as well as standard requirements of VIKO as stated on pages 18 of the self-evaluation report, the qualifications of the teaching staff and their number are adequate to ensure the defined learning outcomes, and the teaching staff turnover is able to ensure an adequate provision of the Study Programme. Problems are seen in the

acquisition of new staff due to the relatively low wages of younger staff compared to the wages paid by industry in Vilnius and due to the fact that VIKO is not allowed to offer own PhD Study Programmes as source of coming teachers. The range of full-time teachers' ages is from 25 to 69 years old (average about 50 years, but only 2 teachers between 45 and 55) and 42 per-cent are over 60 years old. 4 out of 31 have a doctor's degree; one of them is a Professor Dr. Habil.

VIKO creates conditions for the professional development of the teaching staff necessary for the provision of the Study Programme. The teachers have presented their knowledge about the development Study Programmes and their own evaluation, which happens at least all five years. The presentation of the laboratories by the teachers has convinced the experts of their high engagement in knowledge and understanding of actual science status. During the last five years teachers participated in placements abroad, prepared reports, gave presentations in conferences and participated in projects. Five of the teachers working in Electronics Engineering have been invited for expert activity. The involvement of the teaching staff in research is limited due to the reported high teaching load of over 1440 contact hours per year for most of the teachers.

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

The premises for studies are adequate both in their size and quality. The auditoriums are well equipped, the laboratories are in close neighbourhood, the seats and working places are well arranged and the laboratory equipment reflects the modern technologies in the fields of electronics, mechatronics and computers. Some of it was spent by companies to optimise the education for the market value of the students. The teaching and learning equipment (laboratory and computer equipment, consumables) are adequate both in size and quality. There have been remarkable investments in the last years to achieve this high level for an appropriate number of laboratory seats with modern equipment. The experts see only one area where an improvement could be of significant advantage, the field of digital signal processing consisting of microcontrollers, digital signal controllers (DSC) and digital signal processors (DSP).

VIKO has adequate arrangements for students' practice. Smaller practice units are performed in VIKO's laboratories, whereas the units with higher ECTS credits as well as final projects are usually performed in the premises of social partners (companies or other third partners – domestic, abroad or foreign). The experts have informed teachers about foreign possibilities of well-paid intern-ship Study Programmes that could be chosen by the students. The teaching materials (textbooks, books, periodical publications, databases) are adequate and accessible. Much of the teaching material is written in Lithuanian language by teachers of VIKO or other Lithuanian universities, whereas data sheets, user guides and publications are written in English and mostly accessible as free available PDF files from internet. Students and staff have confirmed that printing of these materials is possible for them as well as using it on their own notebooks. The access to some materials is possible via VPN (virtual private network).

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

The admission requirements are based on a competition score which takes account of the secondary education or equivalent education. The scores indicate adequate ability to undertake the program.

Classroom work (lectures, seminars, practical, laboratory works) are evenly distributed – theoretical lectures are followed by practical classes. The equipment in the laboratories is modern and didactically well positioned – it reflects the intensive cooperation with regional companies, not only by the students. Study workload is evenly distributed over the years and semesters. The lecturers take a high load to distribute the presence hours during the week. According to some stakeholders, there is a lack of attention to student self-study and group work, low variety of applied tasks. The graduate attributes are appropriate but some employers believe that better application of new technologies, should be mandatory, to deepen the knowledge of latest innovations systems would be a benefit for future specialists.

Some students are engaged in applied research but not many. They have argued that they are more interested to go as fast into business as possible and research is better done in master programmes. There is very limited take up of Erasmus exchange opportunities in three year full time professional bachelor degree programme. The programme is not offered in English and therefore admission of students from abroad is not a feature. The students have stated financial issues as reasons for low interest to the given mobility opportunities. The students have access to good sports, health and cultural facilities (choir, dance and sports groups). There is an active VK Students' Association. The access of students to computer classes after the study time seems to be limited, although there is an interest in the area.

The assessment method is clear. Grades are determined to a 10-point scale. The scale used for assessment is clearly publicised to the students and is well understood. Course projects, research papers and the final thesis are assessed by grades. Assessment of coursework is assessed as a separate mark to the study module. The final thesis may only be defended when the student has successfully completed all other modules.

## ***6. Study Programme management***

Responsibilities for decisions and monitoring of the implementation of the Study Programme are clearly allocated. Proposals for changes mostly come from teachers and social partners, but they can come from students, too. Decisions for investments are related to a development plan which is updated each year. A department meeting is held each week where they discuss all important matters. For each Study Programme exists their own committee consisting of seven persons. Two of them are in the committee for *Electronic Engineering* as well. The committee is talking with the teachers and Study Programme alterations are influenced

by teachers, students and employers. Information and data on the implementation of the Study Programme are regularly collected and analysed.

The actual evaluation is the first external one, so there is no judgement possible how far the outcomes of internal and external evaluations of the Study Programme will get used for the improvement of the Study Programme, but due to the development of the Study Programme on base of the previous Electronics Engineering Study Programme one could expect it. The evaluation and improvement processes involve stakeholders. In addition to more informal processes, e.g. when meeting in companies due to students' practices, there is a valuable cooperation in the committee. The internal quality assurance (QA) measures are effective and efficient. They look well organised on a hierarchical system with the levels teacher, department, faculty and university. The QA system is based on different procedures. Students are asked for the evaluation each year – a higher participation could be possible and useful. Each teacher does planning for the next and evaluation of the last year. The teacher's accreditation systems give marks dependent on teachers' activities for an attestation all five years. An additional attestation is possible based on special reasons, like the achievement of a doctor's degree.

### III. RECOMMENDATIONS

- 3.1. Implementation of a effective and live feedback system in the quality assuring system presenting the responses to proposals and complaints presenting changes of the Study Program, of modules or other items to the persons concerned
- 3.2. Inclusion of a wider range of Microcontrollers, Digital Signal Controllers and Digital Signal Processors and their application areas (e.g. hand-held systems, energy harvesting systems, mobile phones, multimedia systems) in the courses concerning signal processors and signal processing
- 3.3. Update of the data in study course descriptions
- 3.4. Intensification of exchange possibilities for students and staff (easier and well known way for accepting related theory modules of other – possibly foreign – universities, promotion of intern-ship in foreign countries or companies, foreign research or taught PhD possibilities for excellent bachelor graduates or teachers)
- 3.5. Replacement of older staff and improvement of research possibilities for all staff
- 3.6. Open door of computer rooms for students in the times of no other use of the rooms



## IV. SUMMARY

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

Strong aspects:

- Well defined, clear and publicly accessible, also in English language
- Study programme based on the professional requirements, public needs and on the needs of the labour market.
- Consistent with the type and level of studies and the level of qualifications offered.
- Wide range of hardware and software modules woven into a uniform system

Weaknesses:

- Wish of even more practice in the Study Programme

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

Strong aspects:

- Meets the legal requirements for bachelor Study Programs
- Content, methods and sequence of the courses appropriate for aims and learning outcome
- Reflects the latest achievements in science and technologies due to high investments
- Laboratories support many courses

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

Strong aspects:

- Meets legal requirements as well as standard requirements of VIKO
- Development plan exists
- High engagement, also in practical laboratories

Weaknesses:

- Over 40% over 60 years old
- Only seventh part holds a doctors degree

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

Strong aspects:

- Premises for studies are adequate both in their size and quality
- Laboratory equipment is excellent for teaching of studies
- Good connection to industry for practicums and projects

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

Strong aspects:

- Good combination of lectures, seminars, practical and laboratory works
- Access to good sports, health and cultural facilities

Weakness:

- Minor participation in research and international activities

### ***6. Study Programme management***

Strong aspects:

- Responsibilities for decisions and monitoring of the implementation clearly allocated
- Committee treats information from teachers, students, social partners and government
- Internal QA based on a hierarchical structure works efficient and effective
- Teachers' accreditation is based on attestation of teachers' activities

## **V. GENERAL ASSESSMENT**

The Study Program Electronics engineering (state code – 653H61001) of Vilnius College is given **positive** evaluation.

*Study Program assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation Area in Points*
1.	Study Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Teaching staff	3
4.	Facilities and learning resources	4
5.	Study process and students' performance assessment	3
6.	Study Programme management	4
	<b>Total:</b>	<b>20</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.