



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus kolegijos

Kompiuterių technika **PROGRAMOS (653H69002)**

VERTINIMO IŠVADOS

**EVALUATION REPORT
OF COMPUTER ENGINEERING (653H69002)
STUDY PROGRAMME**

At Vilnius College

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Išvados parengtos anglų kalba
Report language - English

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Kompiuterių technika</i>
Valstybinis kodas	63H69002
Studijų sritis	Technologijos mokslai
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programos rūšis	Koleginės studijos
Studijų pakopa	1 – oji studijų pakopa
Studijų forma (trukmė metais)	Nuolatinė (3,5), iššęstinė (4,5)
Studijų programos apimtis kreditais	210
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Kompiuterių inžinerijos profesinis bakalauras
Studijų programos įregistravimo data	2009-12-30

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Computer Engineering</i>
State code	653H69002
Study area	Technological science
Study field	Electronics and Electrical Engineering
Kind of the study programme	College studies
Cycle of studies	1 st cycle
Study mode (length in years)	Full-time - 3.5 Part-time - 4.5
Scope of the study programme in credits	210
Degree and (or) professional qualifications awarded	Professional Bachelor's degree in Computer Engineering
Date of registration of the study programme	2009-12-30

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The Centre for Quality Assessment in Higher Education

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I. INTRODUCTION

Professional bachelor degree studies in computer engineering have been carried out many years as Study Programs using six semesters (code 65307T116). The last accreditation for this Study Program is valid till 31 December 2012 with 120 national credits. The new Study Program for *Computer Engineering* (code 653H69002) 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 designed from 2009 on and started with the autumn semester on 01 September 2010.

External evaluation of this Vilnius College (further on called VIK) Study Program 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 Program, students, graduates and employers of graduates as well as through visiting the auditoriums and laboratories related to the modules of this Study Program.

The expert group has analysed the Study Program 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 Program 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 Program. The new design of the Study Program has allowed broadening the practical exercises, but students, alumni and industry would like to accentuate the practical components of the Study Program 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 Programs.

II. STUDY PROGRAM ANALYSIS

1. Study Program aims and learning outcomes

The Study Program aims and learning outcomes are well defined, clear and publicly accessible, also in English language. The Study Program 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. It was not possible to get a final verification of the achieved learning outcomes of this Study Program because it was started in 2010, so we have taken the relevant information from the previous Study Program and combined it with the

expectancy based on the differences of both Study Programs, mainly due to an additional semester with more practice. Employers and graduates have confirmed in unison that their wishes for more practice have been reflected and the Study Program 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 Program.

The Study Program 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 Program aims and the specified level of qualifications. The name of the Study Program Computer Engineering, its learning outcomes, content and the qualifications offered are compatible with each other. Computers are seen as systems consisting of hardware and software and with a wide range of complexity from small embedded highly specialised systems up to computers as part of a network. So the learning outcomes are provided by a wide range of hardware and software modules with a useful level woven into a uniform system of computer engineering.

2. Curriculum design

As far as the experts could evaluate from presented materials, the curriculum design meets the legal requirements for professional 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 DSP. 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 computer 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 Program is sufficient to ensure learning outcomes. This has been confirmed by the students and the employers. The range of the Study Program builds a wide base for business work from hardware of various complexities via operational systems to software. The content of the Study Program 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 hardware and software 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 Program provided by the staff is meeting legal requirements as well as standard requirements of VIKO as stated on pages 9 and 10 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 Program. 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 Programs as source of coming teachers. The range of full-time teachers' ages is from 25 to 68 years old (average 49 years) and 38 per-cent are over 60 years old. 7 out of 28 have a doctor's degree, of the two partial-time employed is one of two a Professor Dr. Habil.

VIKO creates conditions for the professional development of the teaching staff necessary for the provision of the Study Program. The teachers have presented their knowledge about the development Study Programs 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. Teaching or research using ERASMUS or other exchange Study Programs is rarely used. Using ERASMUS 5 to 7 teachers have been going abroad for teaching. The involvement of the teaching staff in research is limited due to the relatively high teaching load of over 720 contact hours per year for over 58 per-cents of the teachers. For up-to-date teaching of computer networks a company gave the new equipment and VIKO got the CISCO approval. To acquaint actual knowledge and performance some members of the staff used practices and courses in companies.

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 Programs, which 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.

Some students are engaged in applied research but not many. They have argument 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.

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.

6. Study Program management

Responsibilities for decisions and monitoring of the implementation of the Study Program 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 Program 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 Program alterations are influenced by teachers, students and employers.

Information and data on the implementation of the Study Program 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 Program will get used for the improvement of the Study Program, but due to the development of the Study Program on base of the previous 3-year *Computer Engineering* Study Program 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 system gives 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 an 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 professional bachelor graduates or teachers)

3.5. Longer opening of computer rooms and open door of computer rooms for students in the times of no other use of the rooms

3.6. Replacement of older staff and improvement of research possibilities for all staff

IV. SUMMARY

1. Study Program aims and learning outcomes

Strong aspects:

Well defined, clear and publicly accessible, also in English language

Study Program bases 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

Weakness:

Wish of even more practice in the Study Program

2. Curriculum design

Strong aspects:

Meets the legal requirements for professional 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 well equipped and applicable in 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:

About 40 per-cents over 60 years old

Only fourth 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 Program 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 *Computer engineering* (state code – 653H69002) of Vilnius College is given **positive** evaluation.

Study Program assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation Area in Points*
1.	Study Program 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 Program management	4
	Total:	20

*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.