# STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

## VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS
## STUDIJŲ PROGRAMOS
## *ELEKTRONIKOS INŽINERIJA* (VALSTYBINIS KODAS – 612H61004, 61201T201)
## VERTINIMO IŠVADOS

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## EVALUATION REPORT
## OF *ELECTRONICS ENGINEERING*
## (STATE CODE – 612H61004, 61201T201)
## STUDY PROGRAMME
## AT VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

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|---|---|
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Išvados parengtos anglų kalba
Report language - English

Vilnius
2011

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

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|---|---|
| Studijų programos pavadinimas | Elektronikos inžinerija |
| Valstybinis kodas | 612H61004, 61201T201 |
| Studijų sritis | technologijos mokslai |
| Studijų kryptis | elektronikos ir elektros inžinerija |
| Studijų programos rūšis | universitetinės studijos |
| Studijų pakopa | pirmoji |
| Studijų forma (trukmė metais) | nuolatinės (4) |
| Studijų programos apimtis kreditais | 240 |
| Suteikiamas laipsnis ir (ar) profesinė kvalifikacija | elektronikos inžinerijos bakalauras |
| Studijų programos įregistravimo data | 1997 m. gegužės 19 d. |

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## INFORMATION ON ASSESSED STUDY PROGRAMME

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|---|---|
| Name of the study programme | Electronics Engineering |
| State code | 612H61004, 61201T201 |
| Study area | Technological Sciences |
| Study field | Electronic and Electric Engineering |
| Kind of the study programme | university studies |
| Level of studies | first |
| Study mode (length in years) | full-time (4) |
| Scope of the study programme in national credits | 240 |
| Degree and (or) professional qualifications awarded | Bachelor of Electronics Engineering |
| Date of registration of the study programme | 19 May, 1997 |

CONTENTS

## I. INTRODUCTION

This evaluation report covers the 1st study programme titled Electronics Engineering (State code: 612H61004) offered by Vilnius Gediminas Technical University (VGTU). The previous external evaluation of study programme was carried out on 7th February, 2001. That evaluation was carried out by an expert group formed by the Centre for Quality Assessment in Higher Education. The study programme was duly accredited in accordance with the order of the Minister of Education and Science no. 1965, 02/12/2002 (State Gazette, 2002, No. 122-5473).

The evaluation visit relating to this report was undertaken at VGTU as follows;

| **Thursday, 10 November** | |
|---|---|
| **Visit at Vilnius Gediminas Technical University**<br>***Electronics Engineering (BA programme)***<br>***Electronics (MA programme)*** | |
| 09.00 – 09.45 | Meeting with faculty administration staff |
| 09.45 – 11.00 | Meeting with staff responsible for preparation of SAR |
| *11.00 – 11.15* | *Break* |
| 11.15 – 12.15 | Meeting with teaching staff |
| 12.15 – 13.15 | Meeting with BA students |
| | Meeting with MA students |
| *13.15 – 14.15* | *Lunch* |
| 14.15 – 15.30 | Visiting auditoriums, libraries, other facilities (studios, teaching spaces, computer services, etc.) |
| 15.30 – 16.00 | Familiarizing with students' course and final papers (thesis), examination material |
| 16.00 – 16.30 | Meeting with alumni |
| 16.30 – 17.00 | Meeting with employers |
| 17.00 – 17.15 | Experts private discussion and finalisation of the visit |
| 17.15 – 17.30 | Introduction of general remarks of the visit to the university |
| *17.45 Departure* | |

## II. PROGRAMME ANALYSIS

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

The programme aims are defined in four statements. These statements are clear and cover the key areas that one would expect to find in an Electronics Engineering Bachelor degree. The second statement is rather long although broadly understandable.

The programme learning outcomes are grouped under four groups, knowledge, understanding, special skills and general abilities. Within the group, knowledge, there are three differentiated phrases used, namely, "knowledge of…", "fundamental knowledge of..", and "special knowledge of…". It is not clear how these phrases are to be distinguished by the reader. In general the learning outcomes are clear and well defined.

Evidence is provided to demonstrate that the aims and learning outcomes have been developed over a period of time taking into account legal, academic and professional requirements, the public need, and the need of the labour market. The reviews undertaken in 2003, 2007, and 2011 have had impact even down to module level.

The programme aims and learning outcomes, content and the qualifications offered are compatible with each other. The programme level aims and learning outcomes did not seem to be available on the web site and therefore it is not known how students access these and link them to the module level learning outcomes.

***Main strengths and weaknesses***

The strengths of the programme aims and learning outcomes are:

1. their clarity and organisational structure. It is quite evident from reading them what a Bachelor of Electronic Engineering will be able to do as a consequence of completing the study programme.
2. further strength is the clear linkage of the aims and learning outcomes to external benchmarks such as legal requirements, and the labour market.
3. a good frequency of review of learning outcomes with evidence of impact of these reviews.

The weaknesses of the aims and learning outcomes are:

1. the length of one of the aims, making its meaning somewhat unclear.
2. the use of a variety of forms of knowledge such as fundamental knowledge, and specialised knowledge within the programme learning outcomes is not clearly defined.
3. the lack of visibility of the programme aims and learning outcomes on the website (http://medeine.vgtu.lt/programos/programa.jsp?fak=5&prog=47&sid=F&rus=U&klb=en )

4. the lack of a link for students between the programme level learning outcomes and the module aims and learning outcomes on the website.

### *2.Curriculum design*

The study programme of Electronics Engineering, implemented on 1st September 2011 was designed in accordance with the relevant regulations. The programme is a 4 year programme comprising 240 ECTS credits. The qualification awarded for successful completion of the programme is Bachelor of Electronics Engineering.

The modules studies by the students are spread evenly throughout the programme with the balance of ECTS credits being even. The workload hours per ECTS credit appears to be approximately 27 hours.

The development from the first semester through to the eighth semester is very clear and appropriate with no obvious repetition of material other than in a developing manner, demonstrating that for example the student's general ability in the area of electronics is developed in a staged manner.

The content of the modules is rich and appropriate to the level. The module descriptions given in Annex 3.1 are excellent both in the clarity of their structure and in the content found in sampled modules. One rigorous test of an engineering degree is in the quality of the final year project. This is undertaken by the students on this programme in semesters 7 and 8 through modules final thesis 1, 2 and 3 whose combined credit value is 15 ECTS credits indicating a total workload for the final year thesis of 400 hours. In some cases the final thesis work was undertaken by teams of students, although it appeared that only one report was written.

The teaching and learning methods utilised within the programme are varied and appropriate. Students attend lectures, undertaken laboratory work, individual work, have consultations, and work on projects for example. The assessment of the students is also varied through examinations, laboratory reports, and thesis defence. Some assessment criteria are likely to be difficult to measure such as "preparation for further studies".

The clear mapping of the programme learning outcomes to the modules in Table 2.2 indicates that the scope of the programme is sufficient to ensure the learning outcomes of the programme are met. It is not known if this information is available to students.

The content of the modules reflects the current position of the field of electronic engineering. There is a good blend of fundamental science and mathematics, electronic hardware, software and an appreciation of embedded systems. The book lists are appropriate and up to date, mainly being ones published since the year 2000.

There is evidence to suggest that in some cases the material taught in the general course in the first two years is not strongly linked to the needs of an electronic engineer, for example in the teaching of Physics.

***Main strengths and weaknesses***

The strengths of the curriculum design are:

1. the module description documents given in Annex 3.1 are excellent both in clarity of their structure and in the content found in the sampled modules.
2. the workload associated with the individual final year thesis is indicative of a robust final year project.
3. there is very clear mapping of the programme learning outcomes onto the modules.
4. the book lists given for each module indicate that the module material is up to date and relevant.

The weaknesses of the curriculum design are:

1. some assessment criteria do not appear to have obvious measures.
2. it may not always be obvious to students how the programme learning outcomes map on to the module learning outcomes.
3. the physics lectures are not adopted to the needs of electronic engineering
4. it is not clear that the workload associated with group final thesis work is equivalent to the workload of an individual final thesis.

***3. Staff***

The SAR states that all teachers of this study programme meet the requirements for University teachers set out in the Law on Science and Studies of the Republic of Lithuania (*Official Journal* No. 54-2140, 2009), General Regulation of Technology Sciences (Engineering) (*Official Journal* No. 59-2079, 2005), and the General Regulation of Degree Study Programmes of the First cycle and Integrated Studies (*Official Journal* No.44-2139, 2010).

The profile of the teaching staff is very broad. Many of the academic staff list national or international publications in the field of study. They list external experiences, both National and International, as well as evidence demonstrating good connectivity with the University. The range of qualifications is very appropriate to the subject. Evidence is provided within Annex 3.3

to indicate that many of the teaching staff are qualified in a manner giving confidence that that students will meet their learning outcomes. A large number of the staff holding a doctorate degree or are qualified beyond doctoral level.

The student: staff ratio appears to be 3:1 which is exceptionally good.

Figures are given for the total number, part time number, and full time number of university teachers within the Department. The turnover is stated as being "rather low". The implication is that there have been little new appointments in the last 5 years.

The SAR reports a large range of professional development activities available to the teaching staff as well as other activities undertaken by staff on their own initiative. It is commendable that all staff undertake an internship with a company or scientific institution every 5 years.

Evidence is provided to indicate that time is provided to teaching staff for them to engage in scholarly activity, either pedagogical or scientific research and development, although in discussing this with teaching staff there was quite a range of opinions regarding this matter.

The teaching staff involved in teaching the avionics specialism are somewhat isolated from the faculty, have an age range that is on average above 60 years old and do not have any substantial research activity.

***Main strengths and weaknesses***

The strengths of matters related to staff are:

1. the teaching staff engage well with the University and external organisations both nationally and internationally.
2. the student: staff ratio is exceptionally good at 3:1
3. the requirement to undertake an internship with a company or scientific institution every 5 years is commendable.
4. teaching staff are given adequate time to engage in scholarly activities.
5. the age structure of the teaching staff is quite balanced; the large number of young teaching staff gives a positive outlook for the future.

The weaknesses of matters related to staff are;

1. the non-teaching time available to staff should be reviewed.
2. the avionics specialisation in the BA program is not supported by adequate research activities in the faculty. This potentially disadvantages the students following that stream.

3. the experience of the avionics teaching staff is more related to outdated aircraft electronic systems.

### *4. Facilities and learning resources*

The premises for studies include classrooms, laboratories, computer classrooms and seminar classrooms. The classrooms vary in size and in the audio visual equipment available in the rooms. Laboratories dedicated to a range of activities are utilised in formal class teaching and for informal use by students. The introduction of a development/hobby space for students is commendable.

The teaching and learning equipment is up to date in most, but not all, laboratories. For example some measurement equipment used in association with Labview is quite outdated. The hardware and software provided for students is mostly appropriate to their level of study. The maintenance and updating of hardware and software is appropriate and transparent to the teaching staff.

There is a considerable problem relating to the facilities and equipment available to students undertaking the avionics specialism. The facilities and equipment are outdated bringing into question the ability of these students to achieve learning outcomes SG8.

The provision for students' practice is well organised and evidence is provided regarding the breadth and quality of opportunities available to students in the $4^{th}$ and $6^{th}$ semesters.

Students admitted in 2009 and 2010 undertake professional practice in their 4th and 6th semesters. The two modules were of 7.5 ECTS credits each, making a total of 15 ECTS credits of professional practice. Students admitted in 2011 undertake their professional practice in the 7th semester, a single module of 15 ECTS credits.

The teaching materials made available to the students are in the main appropriate. Evidence was provided to demonstrate that teaching materials such as laboratory scripts and textbooks were reviewed and updated.

### *Main strengths and weaknesses*

The strengths of the facilities and learning resources are:

1. the laboratory facilities within the main Faculty are of good standard with respect to equipment.
2. the introduction of a development/hobby space for students is commendable.

The weaknesses of the facilities and learning resources are:

1. the laboratory equipment available to students following the avionics specialisation is far below international standards.
2. there is not sufficient capacity with respect to the working places in the laboratories.

***5. Study process and student assessment***

Students enter the degree programme after completing secondary education. There is no entrance examination. However students are scored on mathematics, physics and Lithuanian language as well as being allocated points for other areas of achievement for example prize awards, completion of vocational studies. All applications for entry are made online since 2010. In 2010 the range of scores for admitted students was 13.06-20.3Electronics Engineering was the fifth most popular subject in 2010 in the general area of technology science. Some students with high scores do not get allocated their first or second choice of study programme leading to motivation problems.

Overall the admissions procedure is clear and the criteria for admissions well founded.

The completion rate for enrolled students in the electronics faculty has risen dramatically in the last year from around 50% in the years 2007-2009 to 82% in 2010. This is explained by the changing nature of the labour market.

The assessment of students is regulated by the VGTU Senate resolution No. 38-2.5 (30$^{th}$ June 2009). Assessment occurs both during the semester and in the examination period. Students who fail the assessments in the semester are not permitted to take the examinations. All information on assessments, their weight for the module as a whole and the criteria of assessment are available to students. The association of course learning outcomes with particular assessments is not made clear. There is an appeals process regarding assessments. Feedback is provided to students by means of specific classes were generic feedback is given. Students can also request individual feedback but this is not provided automatically. There are procedures in place to avoid plagiarism but no statistics provided.

It is not evident that students understand the link between module learning outcomes and the assessment undertaken within a module as this is not made clear on the information they are provided.

On reviewing the final theses evidence was found to suggest that the standard of work is not consistent across the specialisations. It is also not clear that the workload for those undertaking a group project is equivalent to that of students undertaking an individual project.

There is a wide range of academic and social support. With regards to academic support the teaching staff are available for consultations each week and there are also individual weeks allocated to individual student work. Policies are in place to deal with a wide range of social issues such as debt, and equality of provision. There are a range of scholarships available. All information for students is published on the website of the University.

There are a number of opportunities available for students to engage in scientific and applied sciences activities in their spare time. Some of these activities can link to their project and thesis work. An annual conference is held at which students promote their scientific and applied science work. The best papers are published in the conference material or in a scientific magazine published by the University.

Mobility opportunities are offered to the students in their third and fourth year. The students are offered the chance to study abroad in a number of locations. Recently the students prefer to choose a location where the language of instruction is English. There is strong competition for the popular places. However all students wishing to study abroad are accommodated.

The data regarding the employability of the graduates from the programme is not clear. There are some general statements regarding employment opportunities. Statistical data on the graduate employment could be very useful.

***Main strengths and weaknesses***

The strengths of the study process and student assessment are:

1. the students feel that the criteria assessment and feedback of their work is very good.
2. there is strong evidence that the concept of student work load is well understood throughout the faculty.
3. there is evidence that plagiarism is understood by both students and teaching staff and that the penalties are appropriate.
4. the consultation process provided for students is robust and the students confirm its value.
5. the students are given good training in the process from specification, design, implementation and testing.

The weaknesses of the study processes and student assessment are:

1. the faculty should review the consistency of the standards of project and final thesis work across the three specialisation.
2. the Faculty should consider making clear linkage between course learning outcomes and the particular assessments used within a module.
3. the Faculty should review its policy for maintaining data on the employment of the students graduating from the study programme.

### *6. Programme management*

The Faculty Study Committee is responsible for monitoring/agreeing/checking new study programmes and their modules. The members of the Study Committee are drawn from representatives of the relevant Departments, a student representative, and a representative of the social partners. 1st cycle study programmes are designed by a group of organisers chaired by the manager of the programme. These programmes are then submitted to the Faculty Study Committee. Programmes approved by the Faculty Study Committee are then submitted to the VGTU Study Committee., and after its approval to VGTU Rector and Senate. New programmes are also submitted to the Study Quality Assessment Centre of expertise. New specialisations are approved by VGTU Senate. The Vice–Dean for Studies is authorised by the Dean of the Faculty to implement study programmes, and monitor their operation. The Head of the Electronics Systems Department is the study programme moderator and Programme Committee chairman.

The financing of the study programme is adequate although there is room for improvement in some areas with regards to the number of stations in laboratories. There is noticeably lower funding for the laboratories available to the avionics specialism students.

Data is gathered from students through the student polls. The student poll results are discussed in the Department and at Dean Office meetings. At present the data is not made available to students, who expressed an interest in having access to this data.

The avionics specialisation is managed independently by the Avionics Institute. It is not clear how the University and Faculty oversee this management as there are considerable problems regarding resources and the overall experience these students experience compared to students on the other two specialisations.

There appears to be clear management of the monitoring and penalties associated with plagiarism as evidenced by the understanding shown by both teaching staff and students.

Student involvement in programme management is through representation in the Faculty committee, The Faculty board, and the Faculty Study Committee.

Students undertaking the avionics specialisation have a different teaching and learning experience to students undertaking the other specialisations. In particular the academic staff who teach this specialisation, the facilities, and the equipment are not appropriate to a 21st century avionics specialisation but seem more geared to the repair of last century equipment.

Stakeholder involvement is mainly through the involvement of relevant employers. There is good evidence of a strong relationship between the Electronics Engineering programme and employers through, for example, evaluation of programmes, apprenticeships, final thesis preparation, and a range of informal contacts. More formal arrangements for discussing the study programme with employers and alumni could be considered, such as an industrial advisory group.

Evidence (section 2.6.4 of the SAR) is provided to indicate that issues are raised and solutions found indicating that the internal quality assurance measures are effective. However the structure of the internal quality assurance process, who is responsible, what is dealt with informally and what is dealt with formally, needs more transparency.

***Main strengths and weaknesses***

The strengths of the programme management are:

1. the study program administration demonstrates a good understanding regarding the program aims, program learning outcomes and module learning outcomes.
2. there is evidence that issues raised are discussed and solutions sought and disseminated.
3. there is evidence that plagiarism is understood by both students and teaching staff and that the penalties are appropriate.
4. the budget of the faculty is a good basis for its further development.

The weaknesses of the programme management are:

1. the current position regarding the imminent merger of faculties makes it difficult to see the long term policy with respect to program design.
2. the Faculty should review the teaching staff, facilities, and equipment available to students undertaking the avionics specialisation. Students undertaking this specialisation do not receive an equitable teaching and learning experience.

3. there is no internationalisation strategy with respect to teaching staff. e.g. there is some lack of motivation amongst the staff to attend international conferences
4. the faculty should consider reviewing the time available to young staff to engage in scholarly and research activities at an international level.
5. the faculty should consider making the student survey statistical data available for students.
6. a more formal agreement between industry and university would be helpful.
7. consideration should be given to making more formal use of alumni and employers.

## III. RECOMMENDATIONS

3.1. The programme aims should be reviewed to ensure they are clear.

3.2. The programme learning outcomes should be reviewed to ensure their meaning is clear to students and that there relationship to the module learning outcomes is understood.

3.3. The assessment criteria should be clearly linked to specific learning outcomes and the measure of success regarding the criteria should be made clear.

3.4. The general modules given in the first two years should be reviewed to make clear to students that they are designed to support their later work as electronic engineers.

3.5. The final thesis workload for group and individual projects should be reviewed to ensure a consistency to the workload of an individual student whether working alone or in a team. The Faculty should consider if group work for final thesis work provides all students with the full range of learning outcomes associated with a final thesis project.

3.6. The non-teaching time available to staff should be reviewed.

3.7. The Faculty should review the avionics specialisation in relation to the appropriateness of the teaching staff, the facilities, the equipment, and the equity of their experience compared to students on the other two specialisations. Furthermore the Faculty should consider providing all the necessary facilities and equipment for this specialisation within the main Faculty building.

3.8. The Faculty should consider investing further in laboratories to maintain up to date facilities with sufficient stations to allow a whole class to work together in all laboratories.

3.9. The Faculty should review its methods for maintaining data on the employment of its graduates.

3.10. The imminent merger of Faculties should be resolved as soon as possible to ensure smooth management of the study programmes.

3.11. The Faculty should review its international strategy regarding the exposure of teaching staff to international research and development. This is a critical situation regarding the teaching staff associated with the avionics specialisation.

3.12. Feedback/satisfaction data gathered from students should be made available to students.

3.13. The Faculty should consider engaging with alumni and employers in a more formal way such as an industrial advisory group.

## IV. GENERAL ASSESSMENT

The study programme *Electronics Engineering* (state code – 612H61004, 61201T201) is given **positive** evaluation.

*Study programme assessment in points by fields of assessment*.

| No. | Evaluation Area | Evaluation Area in Points* |
|---|---|---|
| 1. | Programme aims and learning outcomes | 3 |
| 2. | Curriculum design | 3 |
| 3. | Staff | 3 |
| 4. | Material resources | 3 |
| 5. | Study process and assessment (student admission, study process student support, 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 (satisfactory) - meets the established minimum requirements, needs improvement;

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

4 (very good) - the field is exceptionally good.

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