Šiaulių universiteto

Signalų technologija **PROGRAMOS (621H67001)**
VERTINIMO IŠVADOS

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EVALUATION REPORT
OF SIGNAL PROCESSING
STUDY PROGRAMME
at Siauliai University

Grupės vadovas: Team leader:	Prof. Dr. Toomas Rang (group leader)
Grupės nariai: Team members:	Prof. Dr.-Ing. Tilmann Krueger
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Išvados parengtos anglų kalba
Report language - English

Vilnius
2012

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Signalų technologija***
Valstybinis kodas	621H67001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	2 – oji studijų pakopa
Studijų forma (trukmė metais)	Nuolatinė (2)
Studijų programos apimtis kreditais	120 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Robotikos ir kibernetikos magistras
Studijų programos įregistravimo data	**-**

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INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	Signal Processing
State code	621H67001
Study area	Technological science
Study field	Electronics and Electrical Engineering
Kind of the study programme	Full time
Cycle of studies	Second
Study mode (length in years)	2
Scope of the study programme in credits	120 ECTS
Degree and (or) professional qualifications awarded	Master's degree in Robotics and Cybernetics
Date of registration of the study programme	Not mentioned in documents

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I.   INTRODUCTION

Master degree studies in Signal Processing have been carried out at Šiauliai University since 2002. Faculty of Technology at Siauliai University trains students in Technological Sciences (Engineering) Study Programs. Faculty of Technology is carrying out 7 Study Programs for Bachelor's degree (Environment and Professional Safety, Electronics Engineering, Electrical Engineering, Information Engineering, Mechanical Engineering, Sewing Design and Technologies, and Civil Engineering) and 4 Study Programs for Master's degree (Electrical Power Engineering, Information Engineering, Mechanical Engineering, Signal Processing).

According to data of May 2 of 2012, the teaching staff of the Faculty of Technology consisted of 9 professors, 20 associate professors, 11 lecturers and 27 assistants. At the faculty studied 937 students, among them 883 students studied for Bachelor's degree and 54 students for Master's degree. Concerning Study Programs carried out at the Department of Electronics; on May 1st 2012 there were 113 students, among them 102 studied for Bachelor's degree (61 fulltime students and 41 part-time students) and 11 studied for Master's degree.

The Signal Processing is a deepening Master's studies Study Program. The graduates of the Study Program receive the Master degree in Robotics and Cybernetics. Execution of the Signal Processing Master Study Program has never been evaluated by external experts since its launching in 2002.

External evaluation of Šiauliai University (SU) Study Programme 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 of Technology, the group of preparation of the self-evaluation report, teaching staff of the Study Programme, students of the Study Programme and graduates, and their employers.

The expert group has analysed the Study Programme aims and learning outcomes, curriculum of the Study Programme, quality assurance (management) of the Study Programme, study process, staff and other factors. It has to be pointed that SU has close relations with the industry and other institutions of the Šiauliai region and is important for preparation of high qualification specialists for the regional needs. However, this university and specifically Faculty of Technology are not very attractive for enrolling students from other regions of Lithuania. It is stated in the self-evaluation report (see § 13) that *"Study Program demand is related to needs of Northern region of Lithuania (around city Siauliai). Siauliai is industrial city with traditions in industry as food, leather, machinery, electronics. A strong position in Siauliai has electronics industry related to television. There are two factories of TV sets, companies for production of broadcast stations. Strong enterprises are JSC "Salda" (with its daughter enterprise "Ventmatika"), JSC Elga, JSC "Elektronin.s technologijos". Near Siauliai is large oil refinery factory "Orlen Lithuania" in Mazeikiai. The factory is Lithuanian export leader. Food industry is scattered in towns near Siauliai. The level of automation of Lithuania industry is low. There is need for high skilled professionals to bring modern ideas to industry"*.

II. STUDY PROGRAM ANALYSIS

1. Study Program aims and learning outcomes

The Study Programme aims and learning outcomes are satisfactorily defined, they are clear for teaching staff, students and employers. The self-assessment report contains no information on the public accessibility of information on the Study Program aims and learning outcomes. Judging by the English language version of the University web-site, only the name of the Study Program is presented but no information on its aims and learning outcomes. As stated in the self-

assessment report there are only very general expectations presented and they are not supported by results of the real labour market analysis.

The Study Program is oriented towards both practical engineering and scientific research and designated to train students for a scientists, engineers, researchers or teachers career, as it is stated in the self-assessment report (§ 15). To the assessment team opinion, the Study Program, judging by the courses offered, is very narrowly focused because of the local industry needs and domestic university financial possibilities.

The Transferable skills list of the Study Program does not contain graduates ability to communicate in the international professional environment though possible employment in the countries of EU is mentioned. As it was understood from the meeting with the Study Program administration, only informal contacts take place with the industry representatives and no systematic feedback from industry on the aims and learning outcomes is collected. Generally, the Study Program aims and outcomes are consistent with the type and level of studies and the level of qualification. To the assessment team opinion, the name of the Study Program, its expected learning outcomes, the content and the qualifications offered are compatible with each other.

2. Curriculum design

To the assessment team opinion, the curriculum design meets the legal requirements. The study schedule shows that semesters end with 4 week examination session. No clear evidences of the need to have such long exam session were presented.

The study courses of the Study Program are spread evenly, their themes are not repetitive. The content of the courses of the Study Program is consistent with the type and level of the studies. Certain emphasis is given to Biomedical Signal Processing (Biomedical Signal Processing, Biomedical Cybernetics) which can be explained by the existence of a Center at the Faculty involved in research in this area but not supported by any results of the industry/academia needs analysis. But generally, the content and methods of courses/modules of the Study Program are appropriate for the achievement of the intended learning outcomes. However, the self-assessment report contains no information on the free-elective course (semester 3). Some of the Study Program courses content (Computer Vision, Human – Computer Interaction, Biomedical Cybernetics, Sensor Networks, Embedded Machine Vision Systems) reflect the latest achievements in science and technology.

To the assessment team opinion, the scope of the Study Programme is sufficient to ensure the expected learning outcomes taking into account the Program's quite narrow focus.

3. Teaching staff

The teaching staffs involved into teaching the Study Program meet the legal requirements. The qualifications of the teaching staff are adequate to ensure the expected learning outcomes. All teachers of the Study Program have a scientific degree no lower than doctor. Within five years the number of professors in the Study Program has grown from 2 to 4, the number of courses taught by professors has increased from 4 (26.7% of Study Program volume) to 9 (60%), the number of professors in the study has grown from 2 to 3, and the number of courses taught by the study field professors has grown from 4 (44.47%) to 7 (77.8%). All teachers have teaching experience of more than 10 years. At present, the number of the teaching staff is adequate to ensure learning outcomes.

Most teachers of the Study Program are over 60 years old which may cause a threat to the Study Program sustainability. At the moment, there are two young doctors of science in reserve at the Department of Electronics who in the future may start teaching the Study Program. There are also 2 PhD students at the Faculty who in the future can start teaching. Meeting with the Study Program administration however showed that there is no staff development plan to solve

the possible problems. Professional development of the teaching staff is described in University staff development regulations that were approved by the Senate at its meeting in 2008 19 March (Protocol No 22) approve the Rector's order of April 23 2008 (No. V-Is-263).

As stated in the self-assessment report (§ 43) the teachers of the Study Program are active researchers. However, the biggest part of the research activities is carried out by the staff whose age is over 60 years old. It shows that the Department and Faculty administration should more actively involve other teachers of the Study Program in the scientific research.

4. Facilities and learning resources

The premises for studies are adequate both in their size, but the quality level of the study labs needs strong improvement in the near future. However, no plan for the learning equipment and facilities development and upgrade was presented during the site visit. The Study Program curriculum contains no practice unit (see § 58 of the self-assessment report). Only the laboratories of the Department of Electronics are used to prepare Master theses. Having in mind quite poor level of labs equipment it is hard to ensure the proper quality of the graduation works.

Teaching materials and information support of the Study Program are adequate and accessible by students. The University central and the Faculty libraries open every day except Sunday. All University library funds can be ordered from Aleph Library portal. The Faculty has access to 41 subscribed databases (10 of them are suitable for the Study Program, the best one is the ScienceDirect). Also it is possible to use International transLibrary service, the database of graduates' works. Students of the Study Program can use textbooks and other teaching materials prepared by teachers at other universities. Teachers also widely use free electronic resources.

5. Study process and students 'performance assessment

Principles of the admission to the second cycle studies are defined by the "Law on Education and Science" and they are detailed in the "Description of General Requirements of Master's Study Program". The main rule of admission is that the Study Program is open to any persons who has a Bachelor degree or some other university degree equal to it and who meets other requirements determined in the Master's Study Program description.

Admission takes place on a competitive basis according to admission rules agreed with the Ministry of Education and Science of the Republic of Lithuania. The rules are announced in the university internet portal (http://www.su.lt) a few months before the admission starts. However, the specific action plan for attracting students to study under this Study Program was not presented in the self-assessment report and seems to be missing generally (the conclusion is made on the base of discussions at the meeting with the leadership of the faculty and departments).

Classroom work (lectures, seminars, practice, laboratory works) are evenly distributed – theoretical lectures are followed by practical classes. The self-assessment report states that usually classes are at evening time (from 18:00), because many students are employed in local companies. Such order of studies arises a question on the real (not theoretical 30 credits ECTS per semester) workload of students studying the Study Program. Meeting with the Study Program and Faculty administration showed that they do not see any solution to this problem. The situation with the real workload of students brought the assessment team members to the opinion that the organisation of the study process does not ensure an adequate provision of the Study Program and the achievement of the expected learning outcomes. During the meeting with the teaching staff the teachers expressed the opinion that they are not satisfied with the evening time schedule of studies but obliged to take the situation as a reality existing at the Faculty. Students of the Study Program at the meeting with the assessment team expressed the opinion that studies are mostly theoretical; more practical issues should be introduced in studies.

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During studies of the course Methodology of Experiment students are familiarized with the fundamentals of research. In the same first semester of studies all students selects a research advisor and a theme for their Master's thesis. In the second and third semesters students carry out research work together with their research advisors. At the end of both semesters they defend their research reports in front of the department committee. All the forth semester is devoted to research work – to prepare Master's thesis. Students of the Study Program are also encouraged to participate in research carried out at the Faculty and some students participate in the projects carried out at the department

Students are informed on the opportunities to participate in the student mobility Study Programmes and the university has many Erasmus contracts. Despite that Signal Processing, Master's degree students choose one institution - Polytechnic University of Turin in Italy. During the analyzed period 5 students visited this university. The reasons for low interest to the mobility opportunities are, as explained by students, are of financial kind and the daytime employment of many of them.

The level of academic and social support at the university is quite adequate. Students may approach the department and faculty staff about the studies questions. There is a teachers' counseling schedule on the department's billboard. Teachers also advise students by e-mail.

The career center operates at the university. It helps students to find a job, provides information about job vacancies and practice places in the Siauliai region. The center maintains a students' database, to which employers have access.

The University provides social assistance to students who combine education and family life. Consultations of a psychologist or a lawyer are provided free of charge. Students and members of their families may get medical services at the university; take rest at recreation bases in Pasvin or Giruliai. The needed information about social issues can be obtained from the Office of Student at the university by email. The faculty has a students' union, which organizes various events: a festival in September, student's christenings, etc. Students may use the University sport facilities.

The meetings with the Study Program students showed that the assessment system of their performance is clear, adequate and publicly available (explained at the first lesson of each course).

During the assessed period 34 students successfully graduated from the Study Program. Almost all of them were employed during their studies. Two of graduates of the Study Program were admitted to PhD studies at Kaunas University of Technology.

The majority of graduates work according to their specialty. Many of graduates found job places in the TV industry (SC „Siauliai tauro televizoriai", JSC „Banga Electronics", JSC TVC, JSC Splius), security systems enterprises (JSC „Altas", JSC „Telekonta, JSC' G4S), in different enterprises as (JSC „Salda",JSC „Ventmatika", JSC "Elga". Some graduates work at public institutions. However, no traces of a survey carried out on the employers satisfaction with the level of graduates was discovered by the assessment team during the site visit. At the meeting with the assessment group, the alumni expressed the opinion that the University should take efforts to follow-up their career development.

6. Programme management

The self-assessment report states (§ 105, 106) that Study Program committees are formed to coordinate study program carried out at the university, to order, select and certify study modules. Every study program valid at Siauliai University has a group of monitoring study program quality. However, during the site visit the assessment team got the impression from meetings with the administration and teachers that the management of the faculty and department from one side and the teaching staff from another side have large gap in information exchange between each other concerning the development of the Study Program. The system for collecting feedback from students is underdeveloped and needs urgent implementation in the near future.

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At present, no feedback from students is collected. The same situation exists with collecting the feedback from employers. The official external evaluation of the Signal Processing Master's Study Program was not carried out yet. Neither the self-assessment report nor meetings during the site visit provided evidences of any other external evaluations carried out and their results used for the Study Program improvement.

The self-assessment report and meetings during the site visit provided no evidences of systematic involvement of stakeholders in the evaluation and improvement process. The only example of stakeholders (employers) involvement is participation of industry representatives in the work of the graduation thesis defense commissions. However, no evidences of the use of their opinions for the Study Program continuous improvement were presented. The internal quality assurance measures are far not enough for the continuous improvement of the Study Program. The main problem, to the assessment team members' opinion, is lack of the strategic approach (including documented Strategic Development Study Program) and systematic deployment of such measures.

III. RECOMMENDATIONS

3.1. Urgent measures shall be taken on the improvement of the Study Program management, establishing contacts with employers, developing a system for collecting the feedback from all stakeholder groups (students, employers, and teachers) and using the data obtained for the Study Program continuous improvement.

3.2. The Faculty and Study Program administration should keep the entire teaching staff involved into the strategic development of the Faculty, Departments and degree Study Programs.

3.3. Strong encouragement of international components (ERASMUS, TEMPUS, Marie Curie programmes, international projects etc.), both for teachers and students, that should include:
- a better opening of the Study Program for external studies, i.e. easing the recognition of courses in foreign universities at SU,
- offering language courses for teachers.

3.4. A system for the monitoring and analysis of the labour market needs and demands shall be developed. The analysis results shall be systematically used for the Study Program continuous improvement

3.5. Lecture and practical/laboratory studies shall be delivered in day time. Special care shall be taken to meet the ECTS workload requirements for the Master level studies.

3.6. A plan for the learning equipment and facilities development and upgrade should be developed and communicated to the staff of the Faculty and Department.

IV. SUMMARY

Programme aims and learning outcomes

Positive quality aspects

- The programme aims and learning outcomes are satisfactorily defined, they are clear for teaching staff, students and employers
- Generally, the Program aims and outcomes are consistent with the type and level of studies and the level of qualification
- General satisfaction of graduates with the study programme.

Negative quality aspects

- Low level of public access to the Study Program aims and expected learning outcomes.
- No systematic feedback from industry on the aims and expected learning outcomes is collected.
- The Transferable skills list of the Study Program does not contain graduates ability to communicate in the international professional environment though possible employment in the countries of EU is mentioned.

Curriculum design

Positive quality aspects

- The content of courses of the Study Program is consistent with the type and level of studies.
- Sound structure of the Study Program ensuring achievement of the planned Learning Outcomes and qualification by students.
- Some of the Study Program courses content (Computer Vision, Human – Computer Interaction, Biomedical Cybernetics, Sensor Networks, Embedded Machine Vision Systems) reflect the latest achievements in science and technology.

Negative quality aspects

- No systematic measures on the improvement of the curriculum design based on the feedback from employers/graduates are introduced.
- Graduates competences related to the ability to communicate in a professional international environment are not properly supported by the student involvement in the international academic mobility.
- In some of the courses more practical exercises could be of benefit. This is also confirmed by opinions of students of the Study Program.

Teaching staff

Positive quality aspects

- Good level of the Study Program teaching staff qualification.

- Teachers carry out research activities including participation in the European Framework Study Program (e.g. FP6).

Negative quality aspects

- Most teachers of the Study Program are over 60 years old which may cause a threat to the Study Program sustainability.
- The biggest part of the research activities is carried out by the staff whose age is over 60 years old.

Facilities and learning resources

Positive quality aspects

- Libraries, computer rooms and reading rooms at the University and Faculty are accessible for a reasonable period during daytime. The literature available to students is up to date for the Study Programme.
- Teachers widely use free electronic resources.

Negative quality aspects

- The learning equipment and technical facilities of the Program are quite poor and outdated, and unfortunately there was no plan available for the learning equipment and facilities development and upgrade existing at the Faculty and Department.

Study process and students' performance assessment

Positive quality aspects

- The presented final works make a good impression and show a culture of presentation, implying support of students in communication.
- Admission requirements are well-founded; the higher education institution ensures an adequate level of academic and social support.
- Good level of the social support to students provided by the University.

Negative quality aspects

- A specific action plan for attracting students to study under the Study Program seems to be missing generally (only 2 students enrolled to the Study Program last year).
- High level of students drop-out.
- Classroom work (lectures, seminars, practices, laboratory works) taking place in the evening time which does not ensure an adequate provision of the Study Program and the achievement of the expected learning outcomes.
- Low level of student involvement in the international academic mobility which is important for successful acquiring of most of the General Abilities.
- No systematic follow-up of the Study Program alumni professional career development.

Programme management

Negative quality aspects

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- The programme management / strategy is not on a sound basis, the administration seems to have no clear vision of the future. Quality management system is still under development.
- The management of the Faculty and Department from one side and the teaching staff from another side have large gap in information exchange between each other concerning the development of the Study Program.
- No clear evidence of the systematic measures on involvement of employers in the Study Program improvement process.
- The self-assessment report states (§28) that there is large percentage of students leaving the Study Program at first semester. No satisfactory measures are taken to prevent the high drop-out of students (e.g. only 2 state-funded places in 2011, compared to 10 in 2006-09).

V. GENERAL ASSESSMENT

The study programme Signal Processing (state code 621H67001) of Siauliai University is given **positive** evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	2
2.	Curriculum design	2
3.	Teaching staff	3
4.	Facilities and learning resources	2
5.	Study process and students' performance assessment	2
6.	Programme management	2
	Total:	**13**

*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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