



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO  
AUTOMATIKA PROGRAMOS (62401T104 (621H62001))**

**VERTINIMO IŠVADOS**

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**EVALUATION REPORT  
OF AUTOMATICS (62401T104 (621H62001))  
STUDY PROGRAMME  
AT VILNIUS GEDIMINAS TECHNICAL UNIVERSITY**

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## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Automatika</i>
Valstybinis kodas	62401T104 (621H62001))
Studijų sritis	technologiniai mokslai
Studijų kryptis	elektros inžinerija
Studijų programos rūšis	universitetinės studijos
Studijų pakopa	antroji
Studijų forma (trukmė metais)	nuolatinė (2)
Studijų programos apimtis kreditais <sup>1</sup>	80
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	elektros inžinerijos magistras
Studijų programos įregistravimo data	1997 m. gegužės 19 d.

<sup>1</sup> – vienas kreditas laikomas lygiu 40 studento darbo valandų

## INFORMATION ON EVALUATED STUDY PROGRAMME

Name of the study programme	<i>Automatics</i>
State code	62401T104 (621H62001))
Study area	technological science
Study field	electrical engineering
Kind of the study programme	university studies
Level of studies	second
Study mode (length in years)	full-time (2)
Scope of the study programme in national credits <sup>1</sup>	80
Degree and (or) professional qualifications awarded	Master of Electrical engineering
Date of registration of the study programme	19 May 1997

<sup>1</sup> – one credit is equal to 40 hours of student work

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Centre for Quality Assessment in Higher Education

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## I. INTRODUCTION

This assessment report is based on the material on self-assessing 2010 provided by the Vilnius Gediminas Technical University for the study field “Automation”. The evaluated information is reported in Vol. II for the two specializations:

- Automatic systems
- Automatics of mechatronic systems

The responsibility of these two study programmes is with the Faculty of Electronics. The remote study of the self-assessment documents was carried out in September/October 2010. The on-site evaluation was performed by the entire evaluation team on October 29, 2010 on the premises of Vilnius Gediminas Technical University.

### **Friday, 29 October**

09.30 – 10.00 Meeting with faculty administration staff

10.00 – 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 students

*13.15 – 14.15 Lunch*

14.15 – 15.15 Visiting auditoriums, libraries, other facilities (studios, teaching spaces, computer services, etc.)

15.15 – 16.45 Familiarizing with students’ course and final papers (thesis), examination material

16.45 – 17.30 Meeting with alumni and employers

17.30 – 17.45 Experts private discussion and finalisation of the visit

17.45 – 18.00 Introduction of general remarks of the visit to the university

All decisions concerning the final evaluation report have been taken unanimously by the entire team.

Abbreviations:

SER Self-evaluating report

BA Bachelor

MA Master

## **II. PROGRAMME ANALYSIS**

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

#### **1.1. Programme demand, purpose and aims**

Many new technical products heavily rely on automatic control systems. Usually they form an integral part of many engineering products. Specific aspects are the high complexity of modern control systems and their implementation within large applications. In order to meet the present and future requirements the labour market needs a sufficiently high number of well trained engineers in the field of automatic control systems and in mechatronic systems. Besides bachelor graduates, the increasing specialization asks for master graduates with excellent and advanced knowledge in the principles of automatic and automated control of technical systems. A master graduate must be able to analyze and critically assess the present situation of the control system and form proposals for its efficient and economic improvement, choose methods and apply them for solving problems which are poorly defined and often have contradictive technical conditions. A modern MA programme in control systems must provide a wide range of theoretical and practical competence in close agreement with the industrial requirements. The MA graduates find good employment chances despite the present economic situation.

The reviewed MA programme with the two specialisations “Automatic Systems” and “Automatics of mechatronic systems” are fully in line with all the institutional, state and international directives. Several international contacts have been actively developed for the design and the management of these study programmes. They both provide a solid knowledge basis with respect to the professional life of the graduates.

There is a high correlation of the aims with the purpose of the study programmes. Type and proposed cycle of the studies also comply with the aims of the programme.

#### **1.2. Learning outcomes of the programme**

The content of the learning outcomes in the MA programme “Automatic Systems” form a valid and strong basis in order to achieve the intended competence of the students. In the MA programme “Automatics of mechatronic systems” the background in mechanical engineering seems to be somehow weak because the regular MA student holds a BA in electrical engineering (see also sec. 2.1.2).

The learning outcomes cover a very wide spectrum of topics relevant for the professional preparation and comply with the study programme aims and complement each other in a consistent and complementary manner. There is a high correlation between the learning

outcomes and those required by the subject itself. Due to the economic situation presently there are two MA students which could not find a job within one year of graduation. This seems to be an exceptional situation because under normal conditions the graduated students find a job either during their last semester or immediately after graduation.

Generally speaking there is a continuous assessment of the learning outcomes by the teaching staff and the students. The renewal process of both programmes is well defined and considerable attention is given to this process by the responsible members in the staff administration and the teaching staff. The transformation of the learning outcomes in the specialisation “Automatics of mechatronic systems” is somehow reduced due to the fact that the precognition in mechanics is not quite adequate for BA graduates in electrical engineering.

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

### **2.1. Programme structure**

The MA study programme is in close agreement with the legal requirements. The volume of the offered lectures, laboratories and self studies are adequate in view of the programme aims.

Relations and sequence of the MA study programme is well designed. The compulsory subjects form a solid core of the programme; the elective and free-choice subjects are well coordinated with the core programme. The study programme “Automatic Systems” is attractive and appeals to students as reflected in the number of graduates during the recent past. In the MA programme “Automatics of mechatronic systems” there is a certain lack of previous knowledge acquired during the BA programme in the field of mechanics. A MA programme in mechatronic is very often built on a BA programme in mechanical engineering. The learning outcomes reflect this knowledge deficit. Appropriate measures in form of specific additional courses in mechanics should be offered in order to improve this situation.

### **2.2. Programme content**

Both MA programmes comply with the regulations for this study field (see 2.1.)

Between the curricula of the two MA programmes there are rather small differences. Hence the question arises what is the rationale for offering two very similar course programmes. Furthermore it has been noted that for a self-contained course in mechatronic the knowledge acquired during the BA programme in electrical engineering is rather small. Since the differences between the two courses are not significant the proposal is made of considering the merge of the two programmes into one MA programme. Arguments pro and contra such a merge

should be carefully discussed and analysed amongst the responsible staff members. The evaluators can only give this thought-provoking impulse without having a concluding opinion of this issue.

### **3. Staff**

#### **3.1. Staff composition and turnover**

From the CVs it is noted that the staff members have good to excellent teaching experience. There is a good students/professor ratio. Yet it is also noted that some of the teachers of core courses are in the retirement age; e.g. “Micromotors of automatic” given by Prof. Smilgevičius (74) or “Automation of technological complexes” given by Prof. Poška (70). During the visit no convincing concept has been presented with respect to the future staff composition. There are some visiting teachers; but their number should be increased in the future. The technical staff does not seem to be adequate for supporting an engineering MA programme.

There is no clear strategy how the teaching staff will be systematically renewed. The staff turnover is a major issue within the department during the next few years. It offers an important occasion to update and modernize the course contents in the field such as “power converters”, “drives and micro motors”, “automation of technological complexes”. The turnover of the teaching staff can greatly be improved if more research and publication activities are required by the faculty administration. The VGTU offers the possibility of habilitation procedures. But the interest of the teaching staff in such a qualification procedure is rather limited.

*PS. During the visit in Lithuania we have been informed that the habilitation procedure does not exist any more in the country. However, it is still mentioned in the SER. Hence the recommendation remains that more efforts have to be undertaken in order to achieve a systematic and professional career development of junior staff members.*

#### **3.2. Staff competence**

Generally speaking, the research and publication activities of the teaching staff are not adequate. Several individual good profiles have been described during the on-site visit. But the basis with respect to the entire the teaching staff is not sufficient. One of the reasons for this situation may be the relative high teaching workload mentioned by several staff members. Amongst the teaching staff there is a strong motivation of improving and continuously updating

the teaching material. For the faculty staff members there are compulsory trainings at industrial or scientific institutions in different European countries. However, the mobility of the teaching staff is rather small and the readiness to visit international conferences outside Lithuania is very limited. It is recommended that the faculty establishes new scientific contacts with European universities in the field of automatic control. Such an international network may help to improve the research activities whereby the teaching staff can be involved into large EU research projects presently sponsored under FP7. Since the self-assessment report addresses Socrates and Erasmus activities it has to be pointed out that these programmes cover teaching aspects only. The listed publications are dominantly in Lithuanian. International, peer reviewed publications or books in English are the exception. The publication activities in international cited journals and the participation in international conferences should be improved.

In case a teacher has 15 publications of a necessary level in his/her research area and meets other requirements, he/she can take a habilitation procedure which opens a possibility to become a professor and keep on doing a scientific career. It has been noted that the interest of the teaching staff in professional qualification through a habilitation procedure is very small. It is expected that every year one member of the teaching staff successfully completes a habilitation procedure. More support from the administrative staff is expected e.g. by temporally reducing the teaching load of active habilitation candidates. (see also 3.1.)

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

##### **4.1. Facilities**

According to the SER there seems to be a shortage in suitable class rooms because the lectures start in the afternoon and finish in the evening. During the on-site visit it has been noted that most of the MA students are working and hence the lectures and laboratories are only given in the afternoon/evening. This is a totally unacceptable situation because the MA programme is offered as a full time study. Immediate measures should be taken in order to change this situation. The students have adequate study rooms. The library on the departmental level is well equipped with journals and books. There is a large university library; however the MA students do not make frequent use of these facilities.

There are three laboratories

1. Mechatronics laboratory with 16 workplaces.
2. Festo laboratory with 20 workplaces.
3. Automatic control system laboratory with 16 computer workstations.

In view of the actual number of students this seems to be adequate. Modernisation of the laboratory equipment is an ongoing process. The computer facilities are modern and correspond to the requirements of an MA programme.

The practical training is well defined within the MA programmes. There are sufficient training places. The industrial partners are quite helpful in providing places for practical training.

#### **4.2. Learning resources**

The library provides the necessary information for the students by means of textbooks and journals. Publications are only purchased according to the teachers' recommendations and wishes. The students do not make sufficient use of the library facilities. This correlates very much with the teaching activities only taking place in the afternoon and evening (see 4.1.).

The teaching staff provides the students with adequate learning material. In several cases the learning aids are presented in the internet. Good efforts have been noted with respect to preparing the following lecture notes in "Automatic control system optimization", "Technological process automation", and "automatic micromachines" (see also 3.1.).

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

#### **5.1. Student admission**

The admission procedure to the master studies is managed by the admission commission of the University. There is no admission exam. The majority of the MA students have successfully completed an undergraduate course in electrical engineering. The lacking knowledge in mechanics for the MA programme in "Automatics of mechatronic systems" has been noted and correlate with the fact that only 15% of all candidates obtain 10 points whereas in the MA programme "Automatic Systems" 60% of all candidates obtain 10 points. If the two MA programmes will be continued in two separate lines the admission procedure must take this aspect into consideration e.g. by providing a special training course in mechanical engineering before a student of electrical engineering can be inscribed into the MA programme "Automatics of mechatronic systems".

The university maintains an interesting internet page giving all the necessary information concerning the MA programme. The organisation of an open day increases the interest of new students in the MA study programme. Judging from the results reported during the onsite visit these efforts are judged to be quite efficient.

## **5.2. Study process**

According to the self-evaluation report the schedule of the study classes are well distributed during a week and a semester. The sequence of the different courses follows a consistent and well elaborated scheme. The examination sessions are carefully planned and fit well into the study programmes. However, the beginning of the classes in the afternoon limits the flexibility severely (see 4.1.).

The student academic performance is well monitored. The drop-out rate is within acceptable limits. Due to the limited research activities of the teaching staff there is a considerable lack of possibilities for students to actively participate in research.

There are several cooperations with universities and technical colleges outside Lithuania. Some of the teachers make use of the exchange programme but the number of actual exchanges is rather small. The mobility of students is very low. The main reason against mobility given by students is their necessity to work for covering the costs of living. The missing mobility of the students decreases their chances to be successful within the European labour market.

## **5.3. Student support**

The information provided by all institutional entities at VGTU for students is very good. VGTU pays much attention to familiarize the students with career possibilities. The students have close contacts to the teaching staff with respect to study issues and career possibilities. Personal interests of the students are taken into consideration as far as the free and elective studies are concerned.

Scholarships are available for indigent students. However, the MA students stated that they have to work in order to earn their costs of living. This has detrimental effects on the efficiency of the MA studies. Psychological, sports, health and cultural support is available. The number of dormitories is limited.

## **5.4. Student achievement assessment**

The assessment criteria correlate very well with the intended learning outcomes. They are well publicised. There is no ambiguity on the side of the students with respect to the required criteria. The composition of the assessment grade is well and rationally defined.

The assessment results are well communicated with the students. In most cases this is done within personal communications. In some cases the feedback is given via internet or email.

The final thesis assessment requirements are well defined and follow a fixed procedure. The MA students should be invited to publish the main results of their MA thesis in a national or international publication or to present them in a national or international conference.

### **5.5. Graduates placement**

Since the MA program is not yet adapted to the new Lithuanian legislation valid since 2010 the problem of graduate placement has not yet occurred. Due to the close links between the university and the industry no major problem is foreseen when the new requirement for MA students will be implemented.

## **6. Programme management**

### **6.1. Programme administration**

The programme management is executed by the administrative staff on the departmental level. The well defined internal structures (at the university level: the Senate and the rector's office and at the faculty level: the faculty council and the deanery) ensure the high study quality.

### **6.2. Internal quality assurance**

A specific study committee at the faculty is appointed to solve all ongoing study issues including quality evaluation. In particular the committee considers newly prepared or improved study programmes and subject modules and submits them for approval. However, the committee does not seem to pin point specific lectures which need to be updated. During the on-site visit newly prepared lecture programmes for the MA curricula have been presented. From the discussions with the students there are several lectures which urgently need to be updated. The efficiency of the quality evaluation and the definition of new lecture contents correlate very much with the chances offered by the staff turnover (see 3.1.2).

The last reform of the study programmes was performed in 2007/08. During the programme reorganization, study programmes and module changes and necessity for new modules are considered at meetings by the faculty study committee, and at meetings of the deanery and the faculty council. The programme assessment frequency is four years. The efficiency of this process can be improved because the current curricula still contains lectures whose content is not abreast with comparable programmes at other European universities.

The students are regularly invited to take part in the course evaluation. Since this is done on a personalized manner the efficiency of this process is low. Furthermore the results of the students' course evaluation are not published and hence no feedback is offered to the students. The employer and the alumni expressed their satisfaction with the MA programmes. They pointed out that they are adequately integrated into the quality evaluation and improvement process of the MA curricula.

### **III. RECOMMENDATIONS**

3.1. In order to improve the success rate in the MA course “Automatics of mechatronic systems” specific additional courses in mechanics should be offered to BA students in electrical engineering before they can enrol into this course in order to improve the required knowledge.

3.2. Since there are rather small differences between the curricula of the two MA programmes the question arises what is the rationale for offering two very similar course programmes. It would be more efficient to merge the two courses into one modern course in automatic control systems.

3.3. Because most of the MA students work for living the lectures and laboratories are only given in the afternoon/evening. This is a totally unacceptable situation because the MA programme is offered as a full time study. Immediate measures should be taken in order to change this situation.

3.4. Since the research and publication activities of the teaching staff are not adequate incentives have to be specified by the administrative staff to improve this situation.

3.5. The students' mobility is not adequate. There are sufficient possibilities but the motivation of the students is not sufficient.

3.6. Several courses urgently need a modernization of the content.

3.7. The university should expand their international scientific network with more European universities with the aim to be better integrated into EU research projects and activities.

#### IV. GENERAL ASSESSMENT

The study programme *Automatics* (state code – 62401T104 (621H62001)) is given **positive** evaluation.

Table. *Study programme assessment in points by evaluation areas.*

No.	Evaluation area	Assessment in points*
1	Programme aims and learning outcomes	3
2	Curriculum design	3
3	Staff	3
4	Facilities and learning resources	3
5	Study process and student assessment (student admission, student support, student achievement assessment)	3
6	Programme management (programme administration, internal quality assurance)	3
	<b>Total:</b>	18

\*1 (unsatisfactory) - there are essential shortcomings that must be eliminated

2 (poor) - meets the established minimum requirements, needs improvement

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

4 (very good) - the area is exceptionally good

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