



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO
(Panevėžio Technologijų ir verslo fakulteto)
STUDIJŲ PROGRAMOS *Robotika* (612H67001)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF *ROBOTICS* (612H67001)
STUDY PROGRAMME
at ***KAUNAS UNIVERSITY OF TECHNOLOGY***
(Panevėžys Faculty of Technologies and Business)

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Išvados parengtos anglų kalba
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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Robotika</i>
Valstybinis kodas	612H67001
Studijų sritis	Technologijos mokslų studijų sritis
Studijų kryptis	Elektronikos ir elektros inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	Nuolatinė (4 metai)
Studijų programos apimtis kreditais	240 ECTS
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Robotikos ir kibernetikos bakalauras
Studijų programos įregistravimo data	

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Robotics</i>
State code	612H67001
Study area	Technological sciences
Study field	Electronics and electrical engineering
Kind of the study programme	University Studies
Study cycle	First
Study mode (length in years)	Full-time (4 years)
Volume of the study programme in credits	240 ECTS
Degree and (or) professional qualifications awarded	Bachelor of Robotics
Date of registration of the study programme	

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I. INTRODUCTION

The objective of this report is the evaluation of the “Robotics” bachelor study programme (612H67001) offered by Kaunas University of Technology and implemented in Panevėžys Faculty of Technologies and Business of KUT.

Kaunas University of Technology has long traditions of education and research in automation and robotics and Panevėžys region is well known by the strong industrial background. Nowadays there are many fast developing companies and start-ups and necessity for production automation and especially for wider use of robots is growing both in the whole of Lithuania and in the EU. Developing the “Robotics” programme is in good accordance with the broadly recognized fact that wider use of robots is one of the key elements of increasing production efficiency. Therefore, the programme focuses on real and future oriented needs of the society.

The specific Robotics BA program was first proposed and created by the Panevėžys Faculty of Technologies and Business of KUT and then the faculty in Kaunas decided to run a similar parallel programme.

The expert team visited Kaunas University of Technology on 3rd March, reviewing the “Robotics” program. The following report is based on the SER provided by the Kaunas team well in advance on on-site discussions.

The following team carried out the evaluation: Prof. Dr. László T. Kóczy (team leader), Ass. prof. Dr. Marios Kasinopoulos, Prof. Dr. Mart Tamre, Prof. Dr. Roma Rinkevičienė, Dr. Artūras Klementavičius and Gražvydas Jakaitis who all visited Kaunas University of Technology Panevėžys Faculty of Technologies and Business.

We observed that the programme under evaluation was started in 2011, thus, the first class of students has not yet graduated, neither have they started to work on their final thesis projects.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

As the Robotics programme in Kaunas, the Panevėžys programme aims and learning outcomes are very close. Nevertheless the two programme aims and the achievability of the learning outcomes are evaluated separately.

The programme aims and learning outcomes are well defined, clear and publicly accessible. The basic *Robotics* curriculum objectives are to provide electrical, electromechanical, electronics, automatic control, robotics programming, modelling and management, image processing and pattern recognition knowledge, to develop the students' capacity to analyze and evaluate the application of robotics capabilities, select the robot hardware, software, modelling and design of robotic systems, knowledge of computer vision and robotics targeting systems to deal with the issues of robotics application in industries production and social sector and to prepare the students for graduate studies.

It should be mentioned that the aims are discussed and well-reasoned on the ground of the current situation in Robotics R&D tendencies all over the world and of the local situation both in the industrial sector and at the University itself. There are a number of international and several local companies like “Profibus”, Philip Morris, UAB “Kemek Engineering” UAB ROBOTEX, active in the Robotics field, which are also represented in the laboratories in connection with this programme and which are collaborating with the staff members in various industrial development projects. Therefore, it is our strong belief that the aim of the programme deserves attention of these numerous companies is right targeted. Students’ deep involvement in the industry related projects and companies’ interest in the programme is a good sign of the programme aims and companies interest matching. It is also worth mentioning a good connection of the staff’s general experience with the industrial needs, which allows focusing on the real problems. The EU programme Horizon2020 emphasizes the importance of Robotics in future production and service areas and therefore it could be foreseen increase of the need of this kind of specialist in coming years. The labour cost has been low in new EU states for a long time but it is increasing fast nowadays as we live in a joined market area. Without wider use of robots and respective wider preparation of the specialists, it is hard to be successful. It could be concluded that the programme’s focus on the rapid growing sector and the aims will come more valuable in some years. It is worth mentioning that the stakeholders estimated on the meeting with the reviewers the need for the robotic specialists locally up to 20 and more for the whole Lithuania.

Several stakeholders present, representing robotics related companies have expressed their opinion of the Robotics specialisation being also reasonable at M.A. level, where other closely related B.A. graduates (Control Technologies, etc.) could be admitted.

This programme and the current name unambiguously attract the students, which fact is supported by the increasing number of interested school pupils.

The SER provides a clear formulation of the learning outcomes, containing engineering analysis abilities and skills, engineering design skills, research abilities and engineering work abilities, further transferable personal skills. The formulation of the comprehensibility of the learning outcomes seems to be on a good level.

The programme seems to focus on preparing specialists with necessary knowledge and skills for wider area of the robotics and especially with strong practical skills in industrial robotics to develop, serve and maintain robots in large and small production companies and to design control software for these robots and robotised systems. This is surely the need of the production industry and consistent with the EU programme Factory of the Future, etc. Abovementioned is also in good correlation with the programme level (B.A.). It was noticed that the students at this first level would like to have the option to continue towards deeper robotics and according to the companies representatives statements it would be necessary to find the right robotics segment for the region. The relative low number of students might be a problem in longer term and we believe that companies' deep involvement in communicating the speciality to secondary school pupils will improve the situation and attract more students. Considering that, the programme has only three years history the programme is very well balanced and the staff involvement and commitment is high. However bringing some international robotic specialists to teach and deliver courses might intensify and rise the interest for the programme. As it was already mentioned, it is impossible to assess the knowledge and skills of the graduates because the programme has run only three years and first graduates will only come in this year.

2. Curriculum design

The curriculum meets both EU and national legal requirements. There references to and comparison with similar curricula in other EU countries are missing. The courses are well balanced and the learning outcomes are achievable and real. The structure of learning outcomes is good and reasonable to achieve the aim of the programme. The total volume of the academic and individual work hours of the study subjects and the respective volume of the individual study hours conform to the legal acts of the University Academic Regulations.

The length of the studies is 4 - full-time (6 - part-time) years and consists of 240 credits. The programme contains 38 subjects in total and Robotic System project. The total of 24 credits (10%) is allocated for robotics and in order to permit the student a deeper study of robotics alternative and detailed courses are provided (total of 12 credits (5%)). The programme also provides a project in robotic systems designed to gain knowledge of the principles of robotic systems; with a specific purpose to evaluate the capacity of a robotic system in order to assess its cost - effectiveness and prepare technical documentation; an internship for acquiring knowledge about a company and its production processes, the challenges of modernization, as well as to teach understanding of the latest technologies and the use of production processes.

Special attention should be paid to the very good infrastructure of the robotics laboratory and the up-to-date robotic equipment mostly donated by sponsoring companies. The students have a good practical base in these laboratories for the courses and independent work, which assures the good outcome skills of the programme. Worth to mention is also the motivated support staff for the laboratories, where the students can get all required practical assistance.

We found that the involvement of the companies in the curriculum design is good and there is a satisfactory feedback reaching the University from the stakeholders' side. The subjects related to advanced and new robotics directions (service robotics, medicine and human related robotics, rehabilitation robotics, etc.) could be stronger represented in the programme and the programme development in this direction could be appreciated by the students as well as by the companies. Reviewers noticed some new robotics development projects running in the laboratories and therefore it is our strong belief that the curriculum is developing and the development goes to right direction.

There is a compulsory practical training foreseen in the last semester, which has not yet been reached by any student.

3. Staff

There is satisfactory teaching experience of the teachers, conforming to their respective positions. The programme is new (2.5 years old); therefore, the staff is still dynamically developing and forming. Good sign is that there are PhD students present at the Faculty, who already take part in the teaching process.

The staff providing the study programme subjects meets all the requirements. The qualification of teachers is relatively high. Professors and associate professors dominate in giving the courses. Staff members' study visits are relatively concentrated on some limited

number of countries, countries with high level research but the geographical area of collaboration should be broadened.

Publications are at a more or less satisfactory level, however, the intensity of overseas conference participation and publication in world leader scientific periodicals should be also encouraged. Although it is not a critical requirement for the lecturers as it is a bachelor programme, still the experts find that the professional development of the staff should be encouraged. It must be noted that although recent international publications are quite few, generally there are some. Also more focus to advanced robotics (e.g. artificial intelligence) related fields should be encouraged to support the programme. The same applies for the projects as they should be oriented towards an international direction as well. Although, collaborations and relation with the local industry and stakeholders seems good and strong.

There have been some foreign visiting professors, 3-4 visits annually, although the number and focus on the programme could be increased.

Teachers participation in the Erasmus programme is on the satisfactory level but participation in international (e.g. EU) projects should be increased considerably.

The staff did not complain about being overloaded, but the experts impression was that they had insufficient time for research because of the teaching load and lack of research grants.

4. Facilities and learning resources

The available robotics laboratory base is very strong and fully compatible with the programme aims. General laboratories for electrical engineering students are also of high quality. Some of the laboratories are also training sites for the industry personnel and for continuing education, which is a guarantee for the high standards. Interested students have almost unlimited access to the laboratories, even for extracurricular activities.

During the on-site visit the evaluators visited the premises of the general electrical engineering laboratories for automatics and they found them very good. The quantity and the quality of the rooms are suitable for the program and the equipment included is appropriate for the laboratory sessions target. Students said during the meeting that they were very satisfied with the quality of their laboratories.

The visit also to the Robotics laboratories has shown that the robots available for the laboratory sessions, student's projects and staff research work are very impressive. There is a variety of modern and good quality robots with which students can perform a wide range of laboratory work related to mechatronic systems and the interaction of industrial robots and programming. For

example in the laboratory there are the industrial robots ABB IRB 1400, FANUC S6 and MOTOMAN K3 and also the mobile robots Pioneer-class robots P3-DX and P3-AT.

It is noted that Panevėžys Faculty of Technologies and Business of KUT, unlike Kaunas, has industrial robots that were acquired and renewed once the TV factory “Ekranas” went bankrupt.

Another point to note is the fact that all the hardware and software facilities that the programme requires are available and of rather decent technology. In all of the laboratories i.e. general electrical engineering and robots laboratory, there are an adequate number of PC's, video projectors, CNC machines, Microcontrollers Arduinoa and others, with all the required software. Although this equipment is really satisfactory there is still a need for continue monitoring and updating because it is related to a fast changing technology. This is the only way to keep standards at a high level.

The Robotics programme provides the students with a room for them in order to pursue in their individual projects related to the robotic. They also have access to various materials, parts, and workshop equipment they would like to use for their course or individual and often innovative privately motivated projects.

The number of computer workplaces in laboratories and for individual work is sufficient for the available students on the programme; respective computer software licenses are present to perform programming and simulating tasks for robots.

The library offers electronic access to major scientific data bases (e.g. IEEE Explore and Springer Link), although the stock of printed books and periodicals is sufficient, but could be increased.

A visible renovation of parts of the faculty building has been carried out. Some external high level micro-electronics facilities (Mechatronics Centre) are also available for the students interested in deeper research. Currently the programme facilities provide with everything this study programme requires in order for the students to archive its aims and learning outcomes.

5. Study process and student assessment

The admission requirements to the program are clearly explained, well founded, and based on the competition. They are reflected on the University website. The structure of the academic year is conventional: with two semesters and two exam periods. The timetable is constructed for both students and teachers convenience.

The Reviewers feel concern about the number of admitted students. However, it is a good fact, the interest of the potential students has increased and thus it is expected that more

students will enter coming years. It seems promising that the department staff works a lot with schoolchildren promoting the field of robotics visiting schools, delivering attractive lectures and organizing University and company visits for them. The work with the schoolchildren allows expecting some increase in number of students in future. It would be expected that companies' deep involvement in promoting the programme for schoolchildren could even improve the situation.

Students are very satisfied from the whole organisation of their study program. They consider that the distribution between theoretical and practical work of their program is well balanced. In addition to that students are very happy from their timetable. As most of the students in Lithuania work during their studies, most of the university courses are given in the afternoon or evening in a way not to create problems with the work hours. During the meeting with students no significant problems are mentioned or changes have been proposed. On the contrary, students are very satisfied and motivated. The relationship and communication between staff and students is cordial and mutually positive.

During the on-site visit the reviewers have visited the facilities offered by the institution to the student representative organisation accessible for every student. In addition to that, the team has seen also some of the leisure and relaxes facilities available to students which include among other things piano, TV sets, games and others. These can be used by students to relax between lectures.

The detailed assessment regulations are available to students and the university uses a ten-point proportional cumulative scoring system. The assessment criteria are clearly explained and students in general have a feedback from their teachers. Students and staff regularly use Moodle for lectures, tutorials and information exchange purposes.

There has been as far no Erasmus mobility among the students. The international department is ready to help with the recognition of the credits from the study abroad. The lack of mobility is probably due to the fact that the programme functions only for three years now with a relative small number of students and there is no previous experience in student mobility. Besides there are always difficulties among students in going abroad, because most of them try to work during their studies.

Majority of the both full and part time students work during their studies in their specialty field and they expect to get the final thesis topics also from the industry. Companies' interest to provide final thesis topics was confirmed on the meeting with the stakeholders.

Generally speaking, there are some things which should be further developed. However considering that this study programme reached such a high level with no graduates yet, the experts consider the study process of this particular programme as an example.

6. Programme management

The management of the programme is well organized and regularly monitored. The information and data on the implementation of the programme are regularly collected and analysed using internal self-assessment procedure, which involves students and staff.

The Study Programme Committee (SPC) meets regularly and discusses the programme with teachers and students. However this SPC is common for both Robotics programs, the one in Kaunas and this one in Panevėžys and in this committee participates only one student from Kaunas. As a result the local students (Panevėžys) are not represented in the SPC and this is weakness. A solution must be found to face this problem. The reviewer's team suggest that a local SPC should be created, different from the one in Kaunas, to take the responsibility for the academic program in Panevėžys.

Teachers, students and stakeholders involved in the programme feel good engagement in the improvement of the programme. Students have opportunity to assess the subject content and the quality of teaching by completing the assessment questionnaire in students' personal electronic desktops in the University's academic information system. This is done at the end of each semester in order to have feedback. At the meeting with the students and stakeholders the reviewers noticed that none of the Panevėžys Robotics programme students nor stakeholders took part from the Study Programme Committee meetings in Kaunas. Therefore it is the reviewers concern whether the feedback from the teaching process and the process quality in Panevėžys could be taken into account in right manner and timely. During the meeting with students, no one complained that their suggestions are not taken in account. It is estimated that in general the channel of communication between students, staff and administration is very good. Small groups of students might be the reason for the close and positive relationship.

The SER describes how the feedback and respective improvement of the programme is organized to take into account employers opinion and their needs from the company's perspective. It must be noted that the Panevėžys city business representatives hold meetings with the KUT Panevėžys faculty for several years. On the meeting with the stakeholders, the experts noticed the great interest to extend and make more efficient the collaboration between them and the staff of the KUT Panevėžys faculty. This is an important strength for the faculty and

especially for the students because they could easily take projects from the industry and find jobs more easily during their studies and after graduation.

III. RECOMMENDATIONS

1. Take efforts to increase the number of admitted students, both at national and possibly international level. (E.g. by participation at international educational fairs, promotional events and preparing the programme information materials and promotional web site, etc.).
2. Consider the introduction of the Robotics M.A. programme for the graduates of various related specialisations (control engineering, mechatronics, etc.).
3. Tighten collaboration with the similar programme in Kaunas and provide remote access and remote guidance for good robotics resources in Panevėžys.
4. Develop options for Panevėžys students to take on-line or off-line remote, video or e-learning courses from Kaunas and from other universities to diversify the programme.
5. Give motivation to staff and attempt acquiring more funding for making possible more intense participation in major international scientific conferences and research programmes.

IV. SUMMARY

The programme aims and learning outcomes are well defined, clear and publicly accessible. The aim of the programme deserves attention of these numerous companies is right targeted. Students' deep involvement in the industry related projects and companies' interest in the programme is a good sign of the programme aims and companies interest matching. The programme focuses on preparing the specialists with the necessary knowledge and skills for wider area of robotics and especially with strong practical skills in industrial robotics to develop, serve and maintain robots in large and small production companies and to design control software for these robots and robotised systems. This is surely the need of the production industry and consistent with the EU programmes. Bringing some international robotic specialists to teach and deliver courses might intensify and rise the interest for the programme.

The curriculum meets both EU and national legal requirements and students are also satisfied with it. Special attention should be paid to the very good infrastructure of the robotics laboratory and the up-to-date robotic equipment mostly donated by sponsoring companies. The students have a good practical base in these laboratories for the courses and independent work, which assures the good outcome skills of the programme. Worth to mention is also the motivated support staff for the laboratories, where the students can get all required practical assistance.

There is a compulsory practical training foreseen in the last semester that has not yet been realised, this will expectedly improve the stakeholders' feedback to the curriculum.

The staff providing the study programme subjects meets all the requirements. The qualification of teachers is on good level. The staff is still dynamically developing and forming. Good sign is that there are PhD students present at the Faculty, who already take part in the teaching process. Publications are at a more or less satisfactory level, however, the intensity of overseas conference participation and publication in world leader scientific periodicals should be also encouraged. More focus to advanced robotics related fields should be encouraged to support the programme.

The available robotics laboratory base is very strong and fully compatible with the programme aims. General laboratories for electrical engineering students are also of high quality. Interested students have almost unlimited access to the laboratories, even for extracurricular activities. The Robotics programme students have access to various materials, parts, and workshop equipment they would like to use for their course or individual and often innovative privately motivated projects. The number of computer workplaces in the laboratories and for the individual work is sufficient. The library offers electronic access to major scientific databases (e.g. IEEE Explore and Springer Link).

The admission requirements to the program are clearly explained, well founded, and based on the competition. Generally the study process is very good and ensures the best parts of this programme to reach its full potential. The timetable is constructed for both students' and teachers' convenience. Reviewers feel concern about the number of admitted students. However, it is a good fact, the interest of the potential students has increased and thus it is expected that more students will enter coming years. It seems very promising that the department staff works a lot with schoolchildren promoting the field of robotics visiting schools, delivering attractive lectures and organizing University and company visits for them.

The management of the programme is well organized and regularly monitored. The information and data on the implementation of the programme are regularly collected and analysed using internal self-assessment procedure, which involves students and staff.

The Study Programme Committee meets regularly and discusses the programme with teachers and students. The reviewers noticed that none of the Panevėžys Robotics programme students, nor the stakeholders took part from the Study programme Committee meetings in Kaunas. Therefore it is the Reviewers concern whether the feedback from the teaching process and the process quality in Panevėžys could be taken into account in right manner and timely.

V. GENERAL ASSESSMENT

The study programme *Robotics* (state code – 612H67001) at Kaunas University of Technology (Panevėžys faculty) 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	3
2.	Curriculum design	3
3.	Staff	3
4.	Material resources	4
5.	Study process and assessment (student admission, study process student support, achievement assessment)	4
6.	Programme management (programme administration, internal quality assurance)	3
	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.

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<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijų universiteto (Panevėžys) studijų programa *Robotika* (valstybinis kodas – 612H67001) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	3
4.	Materialieji ištekliai	4
5.	Studijų eiga ir jos vertinimas	4
6.	Programos vadyba	3
	Iš viso:	20

* 1 - Nepatenkinamai (yra esminių trūkumų, kuriuos būtina pašalinti)

2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)

3 - Gerai (sistemiškai plėtojama sritis, turi savitų bruožų)

4 - Labai gerai (sritis yra išskirtinė)

<...>

IV. SANTRAUKA

Programos tikslai ir studijų rezultatai yra gerai apibrėžti, aiškūs ir viešai prieinami. Programos tikslas, kuris sulaukė daugelio bendrovių dėmesio, rodo, kad jis tikslingai orientuotas. Studentų aktyvus dalyvavimas su pramone susijusiuose projektuose ir įmonių susidomėjimas programa yra geras ženklas, kad programos tikslai ir įmonių interesai suderinti. Programa pagrindinį dėmesį skiria specialistams, turintiems reikiamų žinių ir platesnių robotikos srities įgūdžių, rengti, ypač ugdant tvirtus praktinius įgūdžius, pvz., kurti, aptarnauti ir eksploatuoti robotus stambiose ir mažose gamybos bendrovėse, kurti valdymo programinę įrangą, skirtą šiems robotams ir robotizuotoms sistemoms. To tikrai reikia gamybos pramonei ir atitinka Europos Sąjungos programas. Pasikvietus keletą užsienio specialistų dėstyti ir vesti mokymo kursus apie robotus, būtų galima sustiprinti ir padidinti susidomėjimą šia programa.

Studijų turinys atitinka ES ir nacionaliniuose teisės aktuose nurodytus reikalavimus, o studentai taip pat yra patenkinti. Ypatingą dėmesį reikėtų atkreipti į labai gerą robotikos laboratorijų infrastruktūrą ir atnaujintą robotikos įrangą, kurią daugiausia dovanojo remiančios

bendrovės. Studentai gali naudotis gera praktine šių laboratorijų baze, kai dėstomi dalykai, taip pat dirbdami savarankiškai. Tai užtikrina gerus programos išugdytus įgūdžius. Verta paminėti motyvuotą pagalbinį laboratorijų personalą, kuris studentams suteikia visą reikalingą praktinę pagalbą. Per paskutinį semestrą numatytas privalomas praktinis mokymas, kuris dar nebuvo įgyvendintas. Tikimasi, kad jis pagerins socialinių dalininkų grįžtamąjį ryšį apie studijų turinį.

Studijų programos dalykus dėstantys dėstytojai atitinka visus reikalavimus. Dėstytojų kvalifikacijos lygis yra geras. Dėstytojai vis dar dinamiškai ugdomi ir formuojami. Geras ženklas – fakultete esantys doktorantai, kurie jau dėsto. Publikacijų lygis yra daugiau ar mažiau patenkinamo lygio, tačiau reikia skatinti aktyviau dalyvauti konferencijose užsienyje ir skelbti publikacijas pasauliniuose pirmaujančiuose mokslo periodiniuose leidiniuose. Reikėtų daugiau dėmesio skirti šiuolaikinėms su robotika susijusioms sritims. Tai turėtų sustiprinti programą.

Prieinama robotikos laboratorijų bazė yra labai stipri ir visiškai atitinka programos tikslus. Bendrosios laboratorijos, skirtos elektros inžinerijos studentams, taip pat yra aukštos kokybės. Studentai gali beveik neribotai naudotis laboratorijomis, net ir neauditorinei veiklai. Robotikos programos studentai turi prieigą prie įvairių medžiagų, atsarginių detalių ir dirbtuvių įrangos, jei jie norėtų, galėtų tai naudoti studijuojamo dalyko ar individualiems bei dažnai novatoriškiems privačiai motyvuotiems projektams. Kompiuterizuotų darbo vietų laboratorijose ir individualiam darbui pakanka. Biblioteka siūlo elektroninę prieigą prie pagrindinių mokslinių duomenų bazių (pvz., *IEEE Explore* ir *Springer Link*).

Priėmimo į programą reikalavimai yra suprantamai išaiškinti, pagrįsti ir remiasi konkurencija. Studijų eiga yra labai gera ir užtikrina galimybę išnaudoti visą geriausių programos dalių potencialą. Grafikas sudarytas taip, kad būtų patogus tiek studentams, tiek dėstytojams. Vertintojams kelia susirūpinimą priimtų studentų skaičius. Tačiau, geras dalykas yra tai, kad potencialių studentų susidomėjimas išaugo, todėl tikimasi, kad daugiau įstos ateinančiais metais. Daug vilčių teikia katedros darbuotojų aktyvus darbas su moksleiviais, reklamuojant robotikos kryptį lankantis mokyklose, skaitant patrauklias paskaitas ir organizuojant vizitus į universitetą bei įmones.

Programos vadyba organizuota gerai ir nuolat stebima. Informacija ir duomenys apie programos įgyvendinimą reguliariai renkami ir analizuojami, naudojant vidaus savianalizės procedūrą, kurioje dalyvauja studentai ir dėstytojai.

Studijų programos komitetas reguliariai susitinka ir aptaria programą su studentais bei dėstytojais. Vertintojai pastebėjo, kad niekas iš Panevėžio robotikos programos studentų, nei socialinių dalininkų nedalyvavo Studijų programos komiteto susitikimuose Kaune. Ekspertams

kelia susirūpinimą tai, ar tinkamai ir laiku atsižvelgiama į grįžtamąjį ryšį apie studijų eigą ir proceso kokybę Panevėžyje.

III. REKOMENDACIJOS

1. Stengtis padidinti priimamų studentų skaičių nacionaliniu ir galimai tarptautiniu lygiu (pavyzdžiui, dalyvaujant tarptautinėse mokslo mugėse, reklaminiuose renginiuose, rengiant informacinę medžiagą apie programą, reklaminę svetainę ir kita).
2. Apsvarstyti galimybę įvesti robotikos magistro laipsnio programą absolventams, baigusiems įvairias susijusias specializacijas (valdymo inžinerija, mechatronika ir t. t.).
3. Stiprinti bendradarbiavimą su panašiomis programomis Kaune ir užtikrinti nuotolinę prieigą bei nuotolinį orientavimą geriems robotikos ištekliams Panevėžyje.
4. Sukurti galimybes studentams Panevėžyje tiesiogiai arba netiesiogiai, vaizdo arba nuotolinio mokymosi būdu studijuoti dalykus, kurie dėstomi Kaune bei kituose universitetuose, siekiant pajvairinti programą.
5. Motyvuoti personalą ir stengtis gauti daugiau finansavimo, kad būtų galima aktyviau dalyvauti pagrindinėse tarptautinėse mokslinėse konferencijose bei mokslinių tyrimų programose.

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