STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KLAIPĖDOS UNIVERSITETO STUDIJŲ PROGRAMOS *BIOMEDICINOS INŽINERIJA* *(valstybinis kodas – 612H16002)* VERTINIMO IŠVADOS

EVALUATION REPORT of STUDY PROGRAMME *BIOMEDICAL ENGINEERING* (*state code – 612H16002*) STUDY PROGRAMME at KLAIPĖDA UNIVERSITY

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Išvados parengtos anglų kalba
Report language – English

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Biomedicinos inžinerija***
Valstybinis kodas	612H16002
Studijų sritis	Technologijos mokslai
Studijų kryptis	Bendroji inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	nuolatinė (4)
Studijų programos apimtis kreditais	240
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Biomedicinos inžinerijos bakalauras
Studijų programos įregistravimo data	2003-06-04

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	***Biomedical Engineering***
State code	612H16002
Study area	Technological Sciences
Study field	General Engineering
Type of the study programme	University studies
Study cycle	First
Study mode (length in years)	Full-time (4)
Volume of the study programme in credits	240
Degree and (or) professional qualifications awarded	Bachelor of Biomedical Engineering
Date of registration of the study programme	4/6/2003

CONTENTS

I. INTRODUCTION

1.1. Background of the evaluation process

The evaluation of on-going study programmes is based on the **Methodology for evaluation of Higher Education study programmes,** approved by Order No 1-01-162 of 20 December 2010 of the Director of the Centre for Quality Assessment in Higher Education (hereafter – SKVC).

The evaluation is intended to help higher education institutions to constantly improve their study programmes and to inform the public about the quality of studies.

The evaluation process consists of the main following stages: *1) self-evaluation and self-evaluation report prepared by Higher Education Institution (hereafter – HEI); 2) visit of the review team at the higher education institution; 3) production of the evaluation report by the review team and its publication; 4) follow-up activities.*

On the basis of external evaluation report of the study programme SKVC takes a decision to accredit study programme either for 6 years or for 3 years. If the programme evaluation is negative such a programme is not accredited.

The programme is **accredited for 6 years** if all evaluation areas are evaluated as "very good" (4 points) or "good" (3 points).

The programme is **accredited for 3 years** if none of the areas was evaluated as "unsatisfactory" (1 point) and at least one evaluation area was evaluated as "satisfactory" (2 points).

The programme **is not accredited** if at least one of evaluation areas was evaluated as "unsatisfactory" (1 point).

1.2. General

The application documentation submitted by the HEI follows the outline recommended by the SKVC. Along with the self-evaluation report and annexes, the following additional documents have been provided by the HEI before, during and/or after the site-visit:

No.	Name of the document
1	Annex to the Diploma (sample text)
2	Annex 2a: List of Teachers of the Study Program
3	Annex on Laboratory Equipment in Physics, Biology and Genetics and Nursing and Anatomy

1.3. Background of the HEI/Faculty/Study field/ Additional information

Klaipeda University (KU) has been founded in 1991. Nowadays it is organized into 6 Faculties which offer academic education by 69 Bachelor- and 51 Master-Degree programs and 10 doctoral study programs. The study program on *Biomedical Engineering* (BME) has been developed from a

previous program named Biophysics in 2011, after the former Department for Biophysics has been reorganized into the Medicine Technologies Department (MTD). The program has been developed based on the needs for experts in modern medical technologies, originally claimed by the Faculty of Health Sciences at KU. MTD itself describes its research strength in the field of *development and employment of biomedical health improving technologies*.

As target employment field for the graduates MTD focusses on clinics etc., where the experts are responsible for the technical equipment for physical constitution analysis, health monitoring and rehabilitation treatment etc.

In previous accreditation dated back to 2013 positive attributes as the programs interdisciplinary and its contribution for the social development of Klaipėda region, the implementation of Dublin descriptors based learning outcome description, the facilities provided to the students etc. have been highlighted. However, lack of engineering content, student's and teacher's mobility etc. have been criticized. In consequence, the study program on BME has been accredited for a three-year period only.

1.4. The Review Team

The review team was completed according *Description of experts' recruitment*, approved by order No. 1-01-151 of Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on 27th *April 2016.*

1. **Prof. dr. Udo Nackenhorst (team leader),** *Head of the Institute for Mechanics and Computation Mechanics at Leibniz University, Germany.*
2. **Prof dr. Rita Mária Kiss,** *Director of Biomechanical Research Center, Budapest University of Technology and Economics, Faculty of Mechanical Engineering, Hungary.*
3. **Prof. dr. Māris Kļaviņš,** *Head of Environmental Science Department, Faculty of Geographical and Earth Sciences, Latvia University, Latvia.*
4. **Mr. Tomas Sinevičius,** *Head of Physical Medicine and Rehabilitation Dep. of Karoliniškės Clinics, doctor of physical medicine and rehabilitation, Lithuania.*
5. **Mr. Gabrielius Jakutis,** *Master student of Faculty of Medicine, Vilnius University, Lithuania.*

Evaluation coordinator Ms. Natalja Bogdanova

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The program aims a first cycle education of specialists, who are skilled in both areas, human physiology and related technical techniques for health care. Learning outcomes (LOs) are described with reference to EUR-ACE Standards 2015 for engineering programs by six descriptors, i.e. “Knowledge and Understanding”, “Engineering Analysis”, “Engineering Design”, “Investigations”, “Engineering Practice” and “Personal Skills”. The last item incorporates skills on “Making Judgements”, “Communication and Team Working” and “Lifelong Learning”. This is a deviation to the “Order of the Minister of Education and Science of the Republic of Lithuania” on “Approval of the Descriptor of Study Cycles” dated back to 2011 which has been provided to the review team. In the latter one five descriptors are distinguished. The review team appreciates that the program managers considered latest state of the art of descriptors.

An overview of competences earned by the students in specific modules is given in Table 1.2.5 of the Self-Evaluation report (SER). A good overview on the curriculums structure is given in a graphical chart. LOs and examination procedures are clearly described in the module cards. However, LOs described in the module cards are not classified by descriptors. Thus it is hard to conclude from the module cards if the program is compatible with EUR-ACE standards as claimed by the HEI. Unfortunately, the internet references given in the SER do not work and/or are available in Lithuanian language only.

Public needs and needs of labour market for specialists educated in this program remain unclear to the review team. About 5 to 10 specialists graduate per year, it is reported that in the region about 2 to 3 specialists are needed per year to be employed in hospitals etc. There is no reference to industrial employers given in the documents. Students commented that there are options for employment for graduates of this program in industry too.

It is mentioned in the SER, that employers have not always satisfied with the graduate’s skills. One employer responded that maintenance of technical equipment in hospitals should be considered in more depth. This for sure is a problem of the program, as this specific technical equipment is not available at the university.

From the interviews held on the onsite visit the reviewers got the following additional information. The HEI targets whole Lithuania for employment market, however, there are no real measures on broadening the employment market. The program management argued that more engineering content has been implemented especially in the medical classes. However, after an interview with the teaching staff, the evaluation team got an impression that this transition to more engineering content was rather unclear. Neither from the curricular structure nor from the module

cards strong engineering content with the aim on design, maintain etc. of technical systems, here for health care and health monitoring, could be concluded. The engineering components in this program mainly focus on sophisticated programming with one special software environment. As the number of students as well as graduates needed for the employment market appears rather low, involved stakeholder should be engaged to discuss on the future of this program. Students consider that it will be difficult to join the narrow labor market and are not secured about their future in the desired field of their studies.

Weaknesses:

- There is a low content of engineering implemented in this program and the technical part is focussed to very narrow field. As a consequence, the employment market is limited and only a few students are enrolled.
- Only a few graduates are employed in the target field of this program.

2.2. Curriculum design

A clear and coherent curriculum is presented; the study program has been explained in a clear structure in form of graphical chart (Fig. 1 within the SER) and in tabular form (Table 1.2.2), which relates modulus to semesters, credits and teachers in responsibility. At a first glace the curriculum appears well designed, a future oriented interdisciplinary program has been developed. The fact of aging societies, increasing knowledge in medical science and related technologies need experts with knowledge between both disciplines, medicine and engineering.

The curricular design of the programs appears consistent with the European standards of first cycle programs (Bachelor). After introductions into the anatomy and physiology of humans and basic mathematics the program focusses mainly on technical systems for health monitoring. One focus is laid on cardio-vascular monitoring and data analysis systems. The program does not aim for the design and construction of related technical systems, for the best some software development and maintenance is covered. Thus it is evaluated that the program's name appears not precise or the content is not sufficient, as engineers must be able to "understand business processes, be adapted at product development and high-quality manufacturing, know how to conceive, design, implement, and operate complex engineering systems of appropriate complexity"[1]. For sure this is of general public knowledge, c.p. Wikipedia. It is not obvious that skills described in the SER (e.g. table 1.1.2) with regard to engineering design, investigations and engineering practice (items D to E) match these goals. It is worth to mention that this issue has been criticised already in the previous

[1] Crawley, Malmqvist, Östlund, Brodeur and Edström, Rethinking Engineering Education, Second Edition, Springer 2014.

evaluation of the program in 2012. As only one example the module card "Bioengineering" is emphasized, which contains fundamentals of metrology in medicine mainly.

To be more precise, the study program focusses on software solutions in modern medical technologies. In addition, this aspect is rather specialized too as major training is on one commercial software system (Labview). The review team realized that all displayed Bachelor-thesis are based on the usage of this software tool. To the opinion of the review team that narrow focus appears not sufficient for a first cycle university education program in engineering.

Subjects are ordered in a consistent sequential manner and spread evenly. There is an amount of about 65% natural science and technical content and of about 35% on physiology etc. of humans. Training methods and evaluation of student's progress appear as very best practice, which can be mastered because of the excellent student's to teacher's ration in this program.

A 240 ECTS first level program is implemented where 15 ECTS points are on general university subjects and 9 ECTS points are given for elective specialization classes. Practice covers the equivalent of 17 ECTS points and the Bachelor-thesis takes 15 points. 1 ECTS point is computed as equivalent to an average work load of 26,7 hours. 172 ECTS credits are given on subjects in the specific field of studies. There are no more than 7 subjects per semester. About 62% of the teachers have an academic degree. By this, the program meets the legal requirement written in the Order of the Ministry on "approving the general requirements of the first degree and integrated study programmes", dated from April 9th 2010.

From the self-report and the interviews, the review team got the impression, that enterprises who produce technical health care equipment or maintain it, are not in the main focus of the university. In addition, the review team got the impression, that the area of the employment marked for graduates of BME program is focussed at the Klaipeda region, however, the administrators argued on targeting clinics over whole Lithuania without giving a number of employers and need for specialists educated in this programme. Furthermore, the program coordination team argued that the employment marked, i.e. demand in clinics for technical specialists educated in this program, will increase with the development of the health care system. The review team has not been convinced by this argumentation.

Perhaps as a consequence only a few students are enrolled in this program. The review team discussed on the economy of the program in comparison to European standards. For sure, there is an outstanding teachers-to-student's ratio, which provides excellent study conditions. On the other hand, Klaipeda University should be motivated to evaluate the economy of this program in total.

The very specific focus on software technologies for biomedical and healthcare questions has not been changed to the reviewers' impression. Major subjects of relevant classical engineering

programs, i.e. electrical engineering or mechanical engineering, are still missing in the curriculum design today.

Strength: The implementation of LOs based on latest EUR-ACE descriptors and the measures on their examination appear very professional.

Weakness: The programs engineering content is very special and limited to a very specialized discipline. The employment marked is very limited and number of enrolled students are low. Students mobility and the invitation of international guest lecturers has to be fostered.

2.3. Teaching staff

The study program is driven by the Department of Medical Technologies at Klaipeda University. About 62% of the teacher have an academic degree and more than half of the classes are taught by academics.

The program is managed by the head of the Department of Medical Technologies. Perhaps it has already been installed by his predecessor, a retired man who still is very active in teaching this program. Many of the lecturers on technical related classes are members of this institute and have been educated in this institution too. Some physiological topics are contributed from medical professionals, but partly by department staff too. It appears questionable to the review team, that based on that narrow basis an engineering education program at European universities level could be carried at all.

The scientific variety of the contributing teachers appears rather narrow, despite the fact that most of them are working in this interdisciplinary field. Only very few, if one, are international recognized experts in their specific discipline, e.g. recognized member in scientific organization or journals.

The international mobility appears in an infant stage, especially when looking to the youth scientists. Only the head of the department had mentionable internships during the last years (9 since 2006). In addition, a little international mobility is visible inside the medical doctors group contributing to the program. It appears mentionable to emphasise that it is important for the scientific development especially of the younger scientists to joint international “world” conferences to grasp up the latest trends in science in their specific field. This will not only reflect the own stage of science within an international rating, but also boosting ideas for future research activities and this spirit has to be plugged into academic university level educational programs. It is highly recommended, that the system provides opportunities to support teaching staff on outgoing.

The research activity of the involved staff is rather low, measured on internationally recognized contributions to leading scientific journals in that field. From the provided CV’s a total

of 16 “international” publications have been identified, authored by the head of the department and his predecessor. Visibility in international scientific societies are documented for the retired predecessor of the head of the Department of Medical Technologies only. Some of the medical doctors contributing to the program refer to a quite low number of scientific publications. However, most stuff members of the department did not document any publication mentionable activity at all.

The turnover of teaching staff appears not adequate, for example a large portion of the program is carried by a retired professor. Many of the teaching staff act in dependency of the programs’ head. It is also obvious, that in comparison to other European universities the ration of full professors, especially in the technical part, is rather low. As the review team learned from their visit, this could be a consequence of the low scientific outcome of the involved teachers too.

With regard to the issue of engineering content and competences trained in the program it is emphasised that none of the academic teachers has a classical engineering education. Many of the contributing teachers of the Department of Medical Technologies have been educated in this department too, which has been developed out of the Biophysics department in 2010.

Weaknesses:

- The research activity and in its consequence the scientific visibility of the teaching staff is low. The international mobility of the teaching staff is insufficient.
- Low competence of teaching staff with regard to engineering disciplines.

2.4. Facilities and learning resources

The facilities provided to this program appear adequate as far as the expectations of the programs management on the LOs are considered only. Classrooms are equipped sufficiently and the library provides very good access to electronic media. The laboratory equipment is very specialized like the program itself, however, in this specific field quite good and state of the art equipment has been presented to the review team.

Additional laboratories used by the students are available in the physics laboratory hosted by the Faculty of Marine Technologies and Natural Sciences, the biology and genetics laboratory and the nursing and anatomy laboratory hosted by the Health Sciences Faculty, where students can access microscopy equipment and general nursing equipment.

Teaching staff is quite satisfied with the equipment and commented, that older equipment will be substituted in near future. In addition, students commented to be satisfied with the learning facilities.

Nonetheless, with regard to the target employment market, students have quite limited access to technical equipment used in clinics, like e.g. x-ray and CT-machines, EKG’s and EEG’s etc. The

program managers argued, that this could be experienced during the practical phases. However, employers commented on limited access for students to latest technical equipment because of insurance reasons. In conclusion there are no facilities available neither to introduce students into the hardware of modern health care monitoring systems nor to train them in a sufficient manner to operate and maintain these.

Strength: Very good library infrastructure and laboratory equipment in this very specialized field are provided.

Weakness: There is only rather limited access for the students to real life state of the art technical health care equipment used by the targeted employers.

2.5. Study process and students' performance assessment

Admission process, organization of the program and achievement of LOs are well described in the SER. The procedure is approved by the senate of the university. Admission to the Biomedical Engineering program is based on a weighted sum of matura grades of applicants, where mathematics, physics and Lithuanian as well as foreign language are considered. The average grade of students admitted to the program in 2014 and 2015 is about 4 to 5 on a ten-point scale. In the same years 13 to 15 applicants have been counted who addressed to this program with first or second priority from which 7 and 10 have been admitted. State funded places are provided to most of the students in the program. The admission procedure appeared suitable and professionally to the review team.

The study process appears well organized. The year is organized in 16 weeks each, autumn and spring term. Timetables are made public before each semester starts. The performance of students enrolled in the program are assessed after each semester. The required leaning outcomes and the related assessments are made public to the students in each module at the beginning of the semester.

There is a good practice established to guide students for research and related space implemented for self-studies within the program, however as mentioned before, limited to a quite narrow field of expertise. An excellent mentoring system for the students is implemented which for sure is a consequence of the excellent teacher to student ratio. Students are involved in research activities at the department, the contribute to scientific papers and local conferences. Students are satisfied with the study conditions in general. The review team evaluated the guidance of students for research activities as suitable; nonetheless, the research field focussed on at the department is rather narrow.

Students' mobility appears invisible; this issue has not been emphasised in the self-report at all. Students reported to be informed on Erasmus programs etc. and expressed to be satisfied with the related information provided to them. The program managed for some incoming lecturers each year, thus the student can at least taste the spirit of alternative teaching methods.

Students are supported in a sufficient manner in academics as well as social aspects. Relevant information with regard to studies, grants loans optional subjects etc. are provided regularly to the students. The expectations for each class are transparent from the first lecture, related information is also available in the internet. The review team experienced an excellent student to teacher ratio and a trustful relationship between them. Additional information on grants and loans are provided by the university. As most of the students in this program are state funded, this criterion does not apply for this program.

LOs are examined in a staggered manner in each module, the final grade in a ten-point scale is calculated as a weighted sum of mid-terms and final (written) exams. The number of mid-term evaluations prevents students from exam-oriented learning; thus the content of classes is taken in depths during the semester. The examination rules are transparent and public to the students. Both parties, teachers and students reported to be fully satisfied with the implemented system on continuous evaluation of students' performance during the on-site interviews. The review team evaluated this system as very efficient and suitable for the LO oriented assessment of students.

From five graduates interviewed on the on-site visit two have been employed in clinics, two are working in the orthopaedics field and one reported to be unemployed. By that the reviewers' impression that the very specialized implement market the managers are focussing does not supply so many offers, even for the low number of graduates from this program.

Strength: A very professional student's assessment system based on LOs descriptors is provided. The supervision of students is excellent.

Weakness: Students' mobility is not visible at all.

2.6. Programme management

The program is managed by the head of the Medicine Technologies Department. The structure of the processes for study programs at Klaipeda University are well described in the SER. There are also described well defined structures on data assessment and information pathway and decisions at the university in total. A self-assessment system is implemented at the university by which study-programs are evaluated every three years. Students are involved in the assessment procedures in a sufficient manner. The programs management as well as the university management believe on the future of this interdisciplinary program and fully support it.

Management rules and pathways for decisions are clearly described in the rules from Klaipeda University. As outlined in the self-report, decisions in the faculty are made based on "principles of democracy and competence". However, the program is driven by one department only, which to the reviewers' opinion defines the layout and targets of the program. In comparison with study program in other European universities this is quite unusual especially for an interdisciplinary program like this. The managers already realized some deficiencies in the opinion of employers and plan to increase their role in the improvement of the study program. The review team would like to recommend the installation of a board with members from all participating disciplines and social partners. Decisions on the future of the program should be made on considering the comments of each party.

However, the management team focusses onto a very special first cycle educational program as outlined before. As reported by the managers during the on-site visit they trust on the fact that Lithuanian future need on health care technologies requires more specialists educated in this very specific program. It appears hard to the review team to follow these arguments, as they have not been underlined by facts, neither in the SER nor during the interviews. The ratio of graduates employed in the target field of this program is rather low and employers wish more technical education.

Strength: Program management structures and processes are well defined at KU.

Weaknesses:

- Managers still stick on their narrow focus of the program despite the fact, that more engineering content has been demanded from the last evaluation and the employers.
- The employment marked of graduates has not been analysed quite well and the educational program has not been adapted to the needs of the employment marked, with the consequence that only few graduates are employed in the target field of the program.
- The management focusses on a very specific educational item, without broadening they view on the general field of science in biomedical engineering. Thus, the programs content appears limited to the programs managers focus.

2.7. Examples of excellence *

The design of the program by definition of LOs based on the latest recommendations and their examination as well as the determination of average working load within the framework of the Bologna-process appears exemplary within EU.

III. RECOMMENDATIONS

1. The scientific content of the program is very narrow; the review team hardly could observe engineering skills educated in this program. Thus the programs name does not describe its content. This has already been criticised by the last evaluation and the measures which have been implemented on that issue have not been satisfying to the review team. In order to change this deficiencies, related subjects from the mechanical and electrical engineering departments should have to be implemented. Another measure could be, to change the name of the program to e.g. "Biomedical Technologies". However, this will not change the fact, that the programs goals are rather narrow with the consequence, that the employment marked will remain narrow too and the number of students will not increase mentionable. It is strictly recommended to install a management board including all stakeholder of this program to develop its structure for a future oriented program with clear definition of qualification profiles with respect to the employment market.

2. In the continuation to recommendation #1 the university and faculty should review their internal structures critically. Sticking on the pre-Bologna structure that one honoured (emeritus) professor still guides the pathways for the future appears not future oriented. Rather than, it is highly recommended to involve highly motivated young people with fresh and new ideas in mind to improve the educational system in the direction of the spirit of Bologna. For sure, on this process it is necessary that the youth scientific staff will go abroad, making experiences in academic university programs in Europe and all over the world. To the opinion of the expert team this is the only way to improve Lithuanian university educational system to adapt to western European standards. Freedom to youth scientist and financial support for going abroad, joining world conferences is strongly recommended.

3. In the same direction of recommendation #2 it is recommended, to increase the mobility program for incoming guest visitors, the student's mobility program on joining summer-schools etc. The management should think about a mobility window in the curriculums design, e.g. no mandatory classes in a specific semester, which helps the students to finish their studies in regular time.

IV. SUMMARY

In interdisciplinary first cycle university level education program on “Biomedical Engineering” has been implemented at Klaipeda University. The design of the curriculum appears very well equilibrated between medical and technical aspects. The curriculum’s outline is consistent with the legal requirements of Lithuania. Leaning outcomes are very well described by descriptors defined in the latest EUR-ACE guidelines for engineering programs, however, not always consistently printed down in the module cards.

The programs content with regard to the technical classes appears rather narrow, main scientific goal is on medical data handling and data management. Real engineering components, like design or maintenance of medical health care technical equipment is not visible in this program. In addition, the students only have very limited access to up to date technical equipment at the site, but also not in practical phases in clinics because of insurance issues. The program aims and the employment market the programs management focusses for are rather narrow, as its consequence the number of enrolled students is low.

Because of the very low engineering content and the fact that none of the academic staff has a traditional engineering scientific record, it has been hard to the review team to classify this interdisciplinary program as an engineering program. It has been recommended to the universities and programs management, either to implement real engineering components or to change the programs name. However, the review team concludes, that the number of students as well as the employment marked could be increased by the first measure only.

The management and the students’ performance assessment are implemented in a strong and efficient manner. However, the teaching staff lacks on scientific expertise. International visibility of leading scientists is judged to be negligible, which appears not acceptable for a university level education program, even for first cycle studies. As lasting measures the mobility of the teaching staff, especially the promising young scientists should be increased mentionable. The same holds for the students’ international mobility, they should be motivated for abroad studies.

V. GENERAL ASSESSMENT

The study programme *Biomedical Engineering* (state code – 612H16002) at Klaipėda University is given **positive** evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation of an area in points*
1.	Programme aims and learning outcomes	2
2.	Curriculum design	2
3.	Teaching staff	2
4.	Facilities and learning resources	2
5.	Study process and students' performance assessment	3
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.

Grupės vadovas:
Team leader: **Prof. dr. Udo Nackenhorst**

Grupės nariai:
Team members: **Prof. dr. Rita Mária Kiss**

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Vertimas iš anglų kalbos

KLAIPĖDOS UNIVERSITETO PIRMOSIOS PAKOPOS STUDIJŲ PROGRAMOS *BIOMEDICINOS INŽINERIJA* (VALSTYBINIS KODAS – 612H16002) 2016-06-21 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-146 IŠRAŠAS

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Klaipėdos universiteto studijų programa *Biomedicinos inžinerija* (valstybinis kodas – 621H62002) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	2
2.	Programos sandara	2
3.	Personalas	2
4.	Materialieji ištekliai	2
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	2
	Iš viso:	**13**

* 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

Klaipėdos universitetas vykdo tarpdalykinę pirmosios pakopos universitetinę studijų programą *Biomedicinos inžinerija*. Programos sandara puikiai subalansuota; išlaikyta medicinos ir technikos sričių pusiausvyra. Programos sandara atitinka Lietuvos teisinį reglamentavimą. Studijų rezultatai gerai suformuluoti pagal naujausiose EUR-ACE inžinerijos programų gairėse pateiktus deskriptorius, tačiau jie ne visada nuosekliai pateikti modulių aprašuose.

Studijų programos turinys, kalbant apie techninį aspektą, yra gana siauras, nes pagrindinis mokslinis tikslas yra medicinos duomenų tvarkymas ir valdymas. Tikrieji inžinerijos komponentai, tokie kaip medicininės sveikatos priežiūros techninės įrangos kūrimas ir priežiūra, neįtraukti į šią studijų programą. Be to, dėl su draudimu susijusių dalykų studentai turi tik labai ribotą galimybę naudotis modernia technine įranga vietoje ir atlikdami praktiką klinikose. Programos tikslai ir darbo rinka, į kurią orientuojasi studijų programos vadovybė, yra gana siauri, todėl įstojusių studentų skaičius mažas.

Dėl labai nedidelio inžinerijos dalykų skaičiaus studijų programoje ir dėl to, kad nei vienas iš dėstytojų neturi įprasto inžinerinio išsilavinimo, ekspertų grupei sunku priskirti šią tarpdalykinę studijų programą prie inžinerijos programų. Universiteto ir studijų programos vadovybei rekomenduojama arba įtraukti į programą realius inžinerijos elementus, arba pakeisti programos pavadinimą. Vis dėlto, ekspertų grupė daro išvadą, kad tik pirmuoju būdu būtų galima padidinti studentų skaičių ir darbo rinką.

Studijų programos vadybos aspektas ir studentų pasiekimų vertinimas įgyvendinami tvirtai ir veiksmingai. Tačiau dėstytojams trūksta mokslinės kompetencijos. Pagrindinių mokslininkų tarptautinis matomumas vertinamas kaip visiškai nežymus, o tai nepriimtina universitetinei studijų programai, net jei tai yra pirmosios pakopos studijos. Kaip ilgalaikė priemonė, minėtinas žymus dėstytojų, ypač jaunųjų mokslininkų, judumo didinimas. Tas pats pasakytina apie tarptautinį studentų judumą; jie turėtų būti skatinami studijuoti užsienyje.

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III. REKOMENDACIJOS

1. Studijų programos mokslinis turinys labai siauras; ekspertų grupė beveik nerado įrodymų, kad šioje programoje būtų ugdomi inžineriniai gebėjimai. Todėl studijų programos pavadinimas neatitinka jos turinio. Šis trūkumas jau buvo kritikuotas ankstesnio vertinimo metu, tačiau priemonės šiai problemai spręsti ekspertų grupei nepasirodė pakankamos. Siekiant pašalinti šiuos trūkumus, reikėtų įtraukti susijusius dalykus iš Mechanikos ir Elektros inžinerijos katedrų. Dar viena priemonė galėtų būti studijų programos pavadinimo pakeitimas į, pavyzdžiui, *Biomedicinos technologijų* studijų programą. Tačiau tai nepakeis fakto, kad programos tikslai gana siauri, taigi ir darbo rinka išliks siaura, o studentų skaičius nedidės. Ypač rekomenduojama įsteigti vadybos komitetą, į kurį įeitų visi šios studijų programos socialiniai dalininkai, kurie parengtų į ateitį orientuotą programą su aiškiai apibrėžtomis kvalifikacijomis, atsižvelgiant į darbo rinką.
2. Tęsiant pirmą rekomendaciją, universitetas ir fakultetas turėtų kritiškai peržiūrėti savo vidines struktūras. Vis dar vadovaujamasi struktūra, kuri buvo taikoma iki Bolonijos proceso pradžios, kuomet vienas garbingas profesorius (emeritas) nustato programos ateities kryptis. Tačiau tokia praktika yra visiškai neorientuota į ateitį. Todėl ypač rekomenduojama pritraukti itin motyvuotus jaunus asmenis, turinčius naujų idėjų, kaip patobulinti švietimo sistemą Bolonijos proceso linkme. Aišku, vykdant šį procesą, būtina, kad jaunieji mokslo darbuotojai vyktų į užsienį ir kauptų akademinę universitetų studijų programų patirtį Europoje ir kitose pasaulio šalyse. Ekspertų grupės nuomone, tai vienintelis būdas patobulinti Lietuvos universitetinio švietimo sistemą, kad ji atitiktų Vakarų Europos standartus. Ypač rekomenduojama suteikti laisvės ir finansinės paramos jauniems mokslininkams vykti į užsienį ir dalyvauti pasaulinėse konferencijose.
3. Įgyvendinant antrą rekomendaciją, siūloma didinti atvykstančių kviestinių dėstytojų judumo programų skaičių, taip pat vykdyti studentų judumo programas, dalyvaujant vasaros mokyklose ir pan. Vadovybė turėtų pagalvoti apie „judumo langą“ studijų programos sandaroje, pavyzdžiui, konkrečiame semestre nenumatyti privalomų dalykų, nes tai padėtų studentams užbaigti studijas įprastu laiku.

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2.7. Išskirtinės kokybės pavyzdžiai

Programos sandara ir studijų rezultatai, suformuluoti remiantis naujausiomis rekomendacijomis, jas išnagrinėjus, taip pat vidutinio darbo krūvio nustatymas, vadovaujantis Bolonijos proceso dokumentais, laikytini pavyzdiniais ES kontekste.

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Paslaugos teikėjas patvirtina, jog yra susipažinęs su Lietuvos Respublikos baudžiamojo kodekso 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

Vertėjos rekvizitai (vardas, pavardė, parašas)