

STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus Gedimino technikos universiteto
**STUDIJŲ PROGRAMOS *BIOINŽINERIJA* (612J76001)
VERTINIMO IŠVADOS**

**EVALUATION REPORT
OF *BIOENGINEERING* (612J76001)
STUDY PROGRAMME**
at Vilnius Gediminas Technical University

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Išvados parengtos anglų kalba
Report language - English

Vilnius
2014

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Bioinžinerija</i>
Valstybinis kodas	612J76001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Biotechnologijos
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	Bioinžinerijos bakalauras
Studijų programos įregistravimo data	2009-08-17, 1-73

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Bioengineering</i>
State code	612J76001
Study area	Technology Sciences
Study field	Biotechnologies
Kind 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 Bioengineering
Date of registration of the study programme	2009-08-17, 1-73

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I. INTRODUCTION

The procedures of the external assessment of the study programmes were initiated by the Centre for Quality Assessment in Higher Education of Lithuania nominating the external assessment peer group formed by the head, professor Maris Klavins (University of Latvia, Latvia), professor Kari Keinänen (University of Helsinki, Finland), professor Arthur J. Ragauskas (Georgia Institute of Technology, USA) and Dr. Egidijus Vladas Baškys, employer representative (Agency for Science, Innovation and Technology, Lithuania), and Raimonda Celiešiūtė, student representative (Vilnius University, Lithuania).

For the evaluation of the study programme the documents, regulating assessment were used (Methodical Guidelines for Experts; Regulations for Undergraduate, Specialised Professional and Integrated Study Programmes, Description of General Requirements for Master's Study Programmes; Description of Study Programme Accreditation Order).

The basis for the evaluation of the study programme (hereafter, the programme) is the Self-Assessment Report, written in 2013, its annexes and the site visit of the expert group to the Vilnius Gediminas Technical University (hereafter, the University; VGTU) on 5th March 2014. The visit incorporated all required meetings with different groups: the administrative staff of the Department of Chemistry and Bioengineering of the Faculty of Fundamental Sciences, staff responsible for preparing the self-assessment documents, teaching staff, students of all years of study, graduates, and employers. The expert group inspected various support services (classrooms, laboratories, library, computer facilities), examined students' final works, and various other materials. After the expert group discussions and additional preparations of conclusions and remarks, introductory general conclusions of the visit were presented. After the visit, the group met to discuss and agree the content of the report, which represents the expert team consensual views.

Mission of the VGTU is to provide studies in engineering field. The unit responsible for a running of the first level study program "Bioengineering" is the Department of Chemistry and Bioengineering of the Faculty of Fundamental Sciences and Research laboratory "Bioinformatics". The realisation of the study program is done in close cooperation with other units of the VGTU and Vilnius University and research institutes attracting highly qualified lecturers and scientists.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

The aim of the *Bioengineering* study programme is to provide students with fundamental knowledge of biotechnology, its engineering applications, to train young professionals with generic competences in social sciences. It seems the aims of the program are unique in Lithuania and the obtained competences well fits in the structure of university education system in Lithuania. Also the research direction well fits into self-identified niche and is appreciated at national level and internationally. The aims and goals are rational, clearly formulated and well related to national development, demands of the labour market and interests of employers and

students. First level study programme in Bioengineering have developed a strong and engaging programme for students that has strong support from the students and social partners. The system how to develop study programme and study plan for each student is logical and well-elaborated and ensures efficient functioning of the study process. There was some interaction with external stakeholders and alumni in the programme renewal process. The study programme fulfils an evident need in Lithuanian society and is popular amongst applicants, largely due to innovative programme aims. The approach suggested includes development of truly interdisciplinary study programme involving biology, chemistry engineering methodology, technology perspective and social science (management) approaches. This aspect is especially important considering the content of student qualification works and their compliance with the obtained qualification.

The learning outcomes of the study programme are well understood and supported by the staff and administration of VGTU, the curriculum and educational /research infrastructure. The defined learning outcomes of the programme are in accordance to Framework Standards for the Accreditation of Engineering Programmes. It is clear that the learning outcomes have been considered for their appropriateness to the demands of the labour market and other professional and societal needs. The written documentation and discussions with the faculty during site committee visit supported this conclusion. Furthermore, the students are strongly supportive of the programme mission and vision and it is equally supported by the social partners. Overall, all the review committee believed that this programme captured key learning outcomes present in other leading institutions in that have developed undergraduate programmes in biotechnology. This programme has a good structured curriculum and apparently includes in the teaching practice issues of data reporting, analysis and presentation. The need to enhance undergraduate research experiences is an issue that should be enhanced in the future along with conference experiences and visits to other international institutions. The programme should also leverage learning experiences with international students *via* the web, provided additional learning resources for incoming students in chemistry and other basic courses which students/teachers feel students are deficient.

2. Curriculum design

The duration and volume of the whole programme (four years = eight semesters; 240 ECTS) and the volumes allocated for general university studies (15 ECTS), subjects of the study field (167 ECTS), preparation and discussion of the final thesis (16 ECTS), and specialized courses (50 ECTS) are in agreement with the legal requirements. The courses are distributed between the eight semesters somewhat unevenly, from 24 to 36 ECTS per semester. The courses are ordered in a logical fashion to facilitate progress of students to more advanced courses with adequate background knowledge.

The curriculum reflects the nature of bioengineering as a multidisciplinary science grounded on physics, chemistry and modern biology aiming at practical applications. Accordingly, the scope is quite wide, appropriate for a bachelor-level (first cycle) education. The main study topics range from electronics and computer science to bioinformatics and law and economics, but the main emphasis is in courses which equip the students with physico-chemical foundation, quantitative skills and biological knowledge necessary for employment or further studies in the

field of biotechnology. The contents are generally consistent with the biotechnology and bioengineering curricula at comparable level internationally (although in most EU countries, bachelor level studies amount to 180 credits, equal to 3 years). The content of basic biology (4 ECTS) is, however, relatively thin and may be insufficient in preparing the students for the more advanced studies in the Master's programmes. This concern was shared by the some of the administration and teaching staff during the site visit. Inclusion of more general biology, and especially physiology and cell biology to the curriculum would give the students a stronger background for the understanding biotechnological approaches to diagnostics and therapy. Most of the courses, especially in the main studies, are compulsory, but within the "Basic university courses" and "Specialization courses" contain some optional courses. Discussions during the site visit indicated that the students were satisfied with the quality and content of teaching, and some courses (Biopharmacy, Organic chemistry, Practises) were named as "best things in the programme". Contemporary research and production in biotechnology is very closely related to different aspects of safety issues, both during studies, both in production. However the safety issues are not adequately reflected in the study program as well as during practical training (instructions for students, individual safety measures, adequate infrastructure etc).

A large variety of teaching methods are employed. The courses can consist of lectures, laboratory practical's, exercises and consultations, and in most courses either hands-on laboratory experiments or problem-based exercises complement the lectures. Bioengineering is an applied, practical science and an important goal of studies is develop skills and competence for critical thinking, experimental design and hands-on skills relevant in biotechnology. Much of the laboratory exercises appears to be performed as group work, but more individual work – important to develop the critical skills - is done within the two Practises (6 ECTS each) and the Final Thesis (18 ECTS in total). The Final Theses are written in Lithuanian but always contain an English summary. Based on their topics (Appendix 8.4.) and the summaries of the theses which were on display during the site visit, the final theses are generally of adequate quality and deal with biotechnologically relevant questions.

Generally, the descriptions of the contents and study methods of the courses are consistent with the indicated aims and learning outcomes. An important task of a first-cycle (bachelor-level) degree programmes is to build strong background knowledge with basic and generic skills that can be used in the job market directly and developed further in Master's level programmes. As judged from the analysis of SER and impressions obtained during the site visit, the curriculum of Bioengineering BA programme works reasonably well in obtaining these goals.

3. Staff

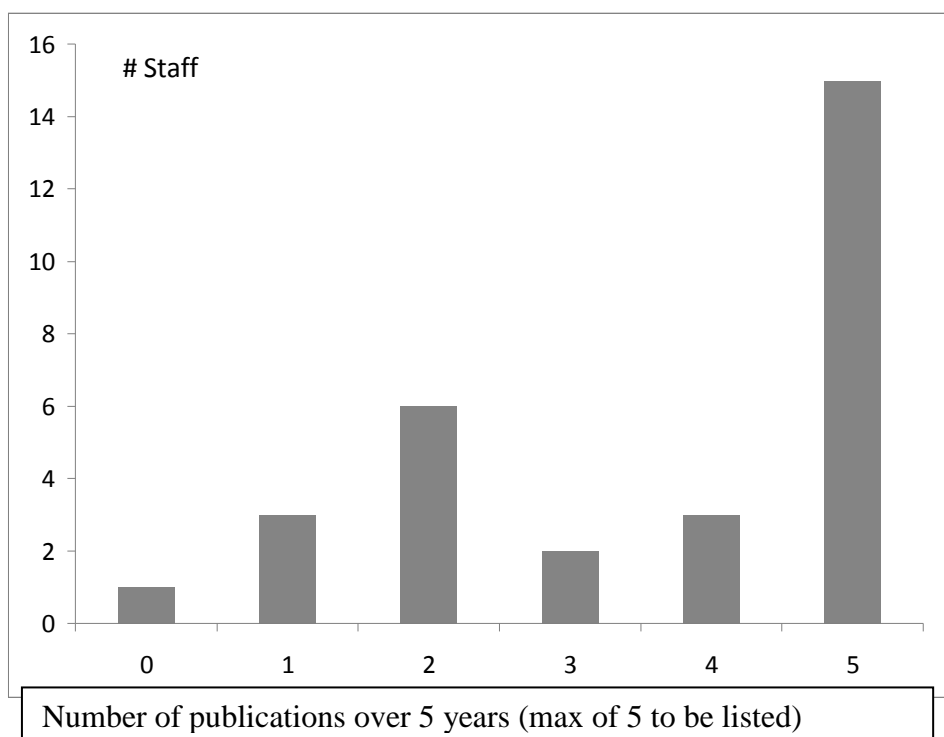
The programme is delivered by a staff of 33 teachers of which 70% are from VGTU and the remaining are drawn from centres of expertise in the Vilnius are such as Institute of Chemistry of the Centre for Physical Sciences and Technology, Institute of Immunology of the Centre of Innovative Medicine, Institutes of Biochemistry and Biotechnology of Vilnius University. The leveraging of non VGTU staff into this study program has been accomplished very professionally and this was evident from student responses and the review committee interactions with teaching staff. On average the staff have 18 years of scientific experience, 11 years of pedagogical experience and 10 years of practical experience. Table 1 summarizes the

academic profile involved in the teaching effort and Figure 1 presents the publication productivity.

Table 1: Academic Positions of Teaching Faculty

Professor	4
Associate Professor	19
Lector	9
Assistants	1

Figure 1: Number of Publications over 5 Years (max of 5 to be listed) for VGTU staff.



A review of the teaching CVs of the teaching staff and discussion with faculty during the site visit made it clear that there were sufficient qualified teaching staff involved in the programme. This opinion was strengthened with site discussions with the participating study programme students and social partners.

Over 50% of the teaching staff reported at least five publications over the last five year period. The committee believes this is a good performance for anyone with substantial involvement in teaching but the remaining staff need to be encouraged to increase their publication productivity. Of course in the spirit of constant improvement, the impact factor of publications should be increased in the next 6 years. The publications in the report and discussed in greater detail during the committee site visit made it clear that that the research activities of the faculty, in general, are relevant to the subjects taught and support high-level up-to-date teaching. The development of four agreements with foreign and Lithuanian entities on conducting scientific research or experimental developments is a promising trend for faculty and staff and should be

encouraged to grow in the future. Likewise, faculty participation in professional organizations, editorial journal boards, peer reviewing, and conference development committees has been noted and needs to increase in the future.

Three of teachers involved in the study programme have participated in long-term on-the-job trainings at foreign universities and other science institutions to upgrade their qualifications. Additionally, several teachers have taken training experiences both abroad and in Lithuania to improve their teaching experiences. The review committee views these exchanges as very beneficial to the study programme should be clearly expanded in the future. Additional exchanges with visiting faculty, alumni, industry representatives, webinars, and workshops should be encouraged and compliment current teaching protocols.

Several of the staff has reported prior teaching experience and this experience is viewed as a positive attribute that would strengthen their teaching experience. As reported in the study programme reports, the average age of teachers involved in the program is 48 years of age with the professors having an average age of 59 years. Although this long expertise is of benefit for the current students, for the long term longevity of the programme the programme administrators need to introduce new staff into the programme before senior faculty retire.

4. Facilities and learning resources

The premises for almost all study duration are located in one Saulėtekis building at the outskirts of the Vilnius city. Lectures for bachelors' studies are carried out in two types of classrooms: a) big classrooms of 110-245 workplaces are used for general lectures; b) smaller ones of 38-68 workplaces are used for specialized courses. Laboratory work takes place in 3 specialized and appropriately equipped classrooms of 15-17 workplaces. There are no problems in respect to accessibility of general facilities (like cafes and etc.). There are all conditions for students with disability to successful studies.

Classrooms specialized for laboratory work during the studies of fundamentals of microbiology, biochemistry, biochemical methods, gene engineering is equipped with spectrophotometers, thermostats, thermo cyclers, centrifuges, DNA and protein electrophoresis apparatus. Classroom specialized for laboratory work during the studies of enzymology, basics of chromatography, bioengineering is equipped with shakers, centrifuges. Classroom specialized for laboratory work during the studies of general, analytical and organic chemistry is equipped according to the requirements for the tasks of general chemistry profile. During the BIOTEFA project material basis for the studies was renovated. The list of 74 items of laboratory equipment is presented in SER. All classrooms are equipped with computers and video projectors. Wireless internet access is available which allows convenient use of personal computers during the lectures. There are five specialized classrooms of 20-30 working places equipped with computers for use of students in bioengineering bachelor study programme.

Students have to do obligatory practice during their bachelor studies and it is a responsibility of a student have to find a practice place by themselves, but some assistance from the department is offered. In accordance with the programme, students have to undergo two practices estimated for

160 hours each at the end of fourth and sixth semester. The first practice is dedicated to visit scientific laboratories and to listen lectures from the leading scientists. Usually this practice is fulfilled in Institute of Biochemistry but students can perform this practice in other organizations or even outside of Lithuania by use of international exchange programmes. For the second practice, students are supplied by list of recommended organizations but they can choose any other one similar to recommended in Lithuania or outside it. According to SAR during the studies bachelors are placed for industrial R&D internship mainly in 4 companies: Biotechpharma, Sicor Biotech, Biocentras, National Feed and Veterinary Risk Assessment Institute.

During on site visit experts discussed that university should pay more attention to safety issues during laboratory and practical training, as well as to consider need to include into the study programme working environment safety basics.

Teaching materials for studies are available at central library of University and at reading room of faculty. The students opinion is that there are not sufficient amount of textbooks presented in VGTU library. Textbooks and learning materials are fully available for almost 70% of the subjects of the study programme. Regular upgrading of study materials is suggested, to exclude use of outdated textbooks. To solve the problem, during the last two years Faculty library acquired many valuable books for students teaching. VGTU has access to main databases, which can also be connected at home using VPC service. Students are provided by internet access to 29 databases in various scientific areas and themes. The library and reading room space is sufficient for the students, with quite long working hours for the library (from 9.00 to 21.00) and 24 hours access to the reading room. Also students can use the newly built Science and Communication center in Saulėtekis, which is open 24/7.

5. Study process and student assessment

The criteria for admission for first study cycle of *Bioengineering* study programme for the Bachelor Degree is a calculated admission mark, no examinations are required for the enrolment. The admission requirements are based on the principles commonly applied at the University. This study programme is state-funded and available only as full-time studies, no options for distance part time or part time studies are available. Total candidates to this study programme increased 38 % during 5 years period, while the number of candidates by first priority doubled. The number of motivated students was increased this way. Total admission increased 11 %. There are minor fluctuations in the average competitive score in 2009 – 2013 which was around 17.52 (SAR p. 23). The ratios of admitted and graduated students (0.79 and 0.70) in the period being assessed shows high motivation of students. The main reasons for discontinuing studies are of personal origin like family circumstances or financial problems.

The duration of the study programme is 6400 hours. Contact training is around 38 % of the programme scope, where lectures take 46 % of contact hours, laboratory-base work 31 %, practices – 23 %. Students have 40 hours of work per week. Optional subjects in the *Bioengineering* study programme comprise 11 credits. The students can choose optional subjects in 7th and 8th semester which corresponds well with the final thesis, so the students can profound

their knowledge in the chosen area. Students have opportunities to agree upon the topic of the final thesis with the Department, employer and final thesis supervisor, taking into account students' preferences and labour market demands.

Students can develop their skills and publish their works by participating in the national conference of young scientists "*Science – Future of Lithuania. Bioengineering and Bioinformatics*" organized by the faculty of Fundamental Sciences and by taking part in the research work contests held by the Lithuanian Academy of Sciences.

Academic and social support is supplied by University and Students association. Student association aims to represent academic interest of students and organize social events, Centre of Physical Training and Sports organises sports activities. Academic staff offers students office-based consultations via internet or Skype during their scheduled hours. Personal consultations with lectures are available as well, lecturers from other institutions are coming in order to save students time.

There is the Integration and *Career Office* running at VGTU. The functions of this unit include qualification improvement and rescaling, continual training studies, vocational guidance of graduates, career development monitoring, placement assistance and coordination of the relationships between the University and external institutions. However, during the assessment the students claimed the lack of real support for real possibilities to get involved in labour market. Staff members of the Department of Chemistry and Bioengineering and FMF Dean's Office provide consultations to students on career opportunities. Close contacts are maintained with potential employers – member companies of the UAB "Biocentras", UAB "Biotechpharma", "Teva Sicor Biotech" UAB, Thermo Fischer Scientific and others.

Still the situation in labour market requires to pay more attention to career consultation, and advice for students. Student disappointment was evident during discussions and clearly indicated a need to put more efforts on this kind of activities. In this respect a significant resource is alumni.

The mobility of students is increasing during the period being assessed, however only 2.5 % of students of the *Bioengineering* programme took part in the mobility scheme. Information on partial studies at foreign universities, integration in the process of international studies and ERASMUS programme is provided by the Department of International Relations of the University as well as in the newsletter published by University.

Three types of scholarships are available for VGTU students: social, memorial and annual. These grants are dedicated for socially vulnerable persons. Memorial Scholarships and scholarships for good academic achievements are awarded for outstanding academic and research achievements by the order of the Rector.

Academic fairness is ensured by individual tasks. In cases of cheating corresponding actions are undertaken, the highest penalty is removal from the University. Essays and final theses of the students are presented in electronic versions and checked for plagiarism. A *bona fide* statement confirming the authenticity is signed by students as it was verified during the assessment. The process of students evaluation is clear and fair. The assessment is performed by giving a grade or

marked as passed/failed. The programme *Bioengineering* foresees the following types of assessment: examination, yearly/term project pass/upgraded exam, report and final thesis. As knowledge assessment criteria is explained by lecturers during first lectures. Final grade consist of the tasks set forth in the course module during the semester, grade of interim assessment on theoretical aspects and exam grade received during the examination session.

Academic progress of students is revealed from the analysis of students' examination results. A slight difference in academic progress is seen for the last year students (SER Table 14) where the average grade is higher than that for 1st-3rd year students especially it is seen for the spring semester. The examination results show that weighted average of grades is 8. The analysis of academic progress of students revealed that the weighted average was higher for the autumn semester in students who enrolled in 2012.

A certain part of students consider emigration as a good possibility to adapt to labour market. Thermo Fischer Scientific, Teva Sicor Biotech UAB, UAB "Biocentras" are the companies in biotechnology area, which employed some of the graduates of this programme. More than 80 % of students graduated in 2012 continue their studies in master study programmes in Lithuania and abroad.

6. Programme management

The programme management system is well functioning and is based on structured process organised at VGTU with identifiable responsibilities and tasks. At the management of the programme of importance is the strong position of the Department of Chemistry and Bioengineering in the VGTU. Positive leadership is of importance at successful functioning of the programme. An important element of the programme management is preparation of self-assessment report. However, the aim of self-assessment is not only to sum up existing situation, but look forward, to identify, weaknesses and develop solutions for them. In this respect development of staff renewal programme could be recommended. Further as a problem can be identified the system of quality assurance and student opinion consideration. If the expert team got an impression that student surveys are regular and well-functioning, then evidences about student feedback efficiency in respect to regular study process management was not so convincing: majority of students were not aware on the functioning of QA/QC system and to what degree their opinions are considered at the study quality management process.

Communication between students and academic staff is good ("open door" policy) and students as well as graduates appreciate it. An important aspect of the study programme management includes involvement of local and international stakeholders in development of the study programme content. This aspect is especially important considering the applied character of the study program and in this respect direct involvement of practitioners into the study processes (as lecturers, supervisors of BSc thesis) could be acknowledged. The same is true also in respect to work with alumni- much could be done to improve and develop well-functioning system how to work with alumni, considering opinion survey on the study quality, suggestions for study program improvement, support for a life-long learning.

III. RECOMMENDATIONS

1. To consider possibilities to include into the curricula of the study programme more courses covering basic issues in biology. Taking into account the profile of the employment of graduates it could be suggested to pay more attention to study courses supporting development of generic skills, including development of entrepreneurship, management, skills to present results and others.
2. To ensure long-term stability for the programme, a staff renewal/younger faculty recruitment policy should be developed and implemented.
3. To pay more attention to career consultation, and advice for students. To develop system how to work with alumni, considering opinion survey on the study quality, suggestions for study programme improvement, support for a life-long learning.
4. To continue efforts to rise international research productivity of the staff, development of pedagogical skills.

IV. SUMMARY

The aim of the *Bioengineering* study programme is to provide students with fundamental knowledge of biotechnology, its engineering applications. The aims and goals are rational, clearly formulated and well related to national development, demands of the labour market and interests of employers and students; the programme is unique in Lithuania and the obtained competences well fits in the structure of university education system in Lithuania. The curriculum reflects the nature of bioengineering as a multidisciplinary science grounded on physics, chemistry and modern biology aiming at practical applications. The curriculum of Bioengineering BA programme builds strong background knowledge with basic and generic skills that can be used in the job market directly and developed further in Master's level programmes. The staff qualification is high and most of teaching staff are actively involved in the research. Study premises are adequate for successful functioning of study programme and of importance is close cooperation with research institutes and enterprises. The programme management is reasonably well functioning, however as problem might be considered age balance of the staff and in this respect development of staff renewal programme could be suggested. Communication between students and academic staff is good.

Still for the further improvement of the programme of importance would be more close involvement of local and international stakeholders in development of the study programme content. The same is true also in respect to work with alumni - much could be done to improve and develop well-functioning system how to work with alumni, considering opinion survey on the study quality, suggestions for study programme improvement, support for a life-long learning.

V. GENERAL ASSESSMENT

The study programme *Bioengineering* (state code 612J76001) at Vilnius Gediminas Technical University is given **positive** evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	4
2.	Curriculum design	3
3.	Staff	3
4.	Material resources	4
5.	Study process and assessment (student admission, study process, student support, achievement assessment)	3
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

Vilniaus Gedimino technikos universiteto studijų programa *Bioinžinerija* (valstybinis kodas – 612J76001) vertinama **teigiamai**.

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

Bioinžinerijos studijų programos tikslas – suteikti studentams pagrindinių biotechnologijos mokslo žinių ir išmokyti taikyti jas inžinerijoje. Tikslai ir uždaviniai yra pagrįsti, aiškiai suformuluoti ir susieti su nacionaline plėtra, darbo rinkos poreikiais bei darbdavių ir studentų interesais; ši programa Lietuvoje unikali, o įgytos kompetencijos atitinka *Lietuvos universitetinių studijų sistemą*. Studijų turinys atspindi bioinžinerijos kaip daugiadisciplinio mokslo, pagrįsto fizika, chemija ir moderniąja biologija, pobūdį ir yra nukreiptas į praktinį jos taikymą. *Bioinžinerijos* bakalauro studijų programa suteikia tvirtą teorinį pagrindą ir ugdo pagrindinius ir bendruosius įgūdžius, kurie gali būti tiesiogiai panaudojami darbo rinkoje ir toliau ugdomi studijuojant magistrantūros programas. Personalas yra aukštos kvalifikacijos, daugelis dėstytojų dalyvauja mokslinėje veikloje. Studijoms skirtos patalpos yra tinkamos studijų programai įgyvendinti, be to, šioje srityje glaudžiai bendradarbiaujama su mokslinių tyrimų institutais ir įmonėmis. Programos vadyba organizuojama gerai, tačiau darbuotojų amžiaus santykį būtų galima laikyti problema, taigi siūlytume parengti personalo atnaujinimo programą. Studentų ir akademinio personalo ryšys geras.

Toliau tobulinant šią studijų programą į šį darbą reikėtų įtraukti daugiau vietos ir užsienio socialinių dalininkų. Reikėtų palaikyti glaudžius ryšius su *alumnais* – sukurti gerai veikiančią grįžtamojo ryšio sistemą ir ją nuolat gerinti, rengti *alumnių* nuomonės apie studijų kokybę apklausas, išklausti jų pasiūlymus dėl studijų programos gerinimo, mokymosi visą gyvenimą užtikrinimo.

III. REKOMENDACIJOS

1. Apsvarstyti galimybę įtraukti į studijų programą daugiau dalykų, apimančių bendruosius biologijos klausimus. Atsižvelgiant į absolventų darbo profilį būtų galima patarti daugiau dėmesio skirti studijų dalykams, padedantiems ugdyti bendrąsias kompetencijas, įskaitant verslumo, vadybos, rezultatų pateikimo ir kitus gebėjimus.
2. Siekiant užtikrinti ilgalaikį šios programos stabilumą, reikėtų kurti ir įgyvendinti personalo atnaujinimo ir (arba) jaunesnių darbuotojų priėmimo į fakultetą politiką.
3. Daugiau dėmesio skirti studentų konsultavimui ir informavimui karjeros klausimais. Sukurti darbo su *alumnais* sistemą, rengti *alumnių* nuomonės apie studijų kokybę apklausas, išklausti jų pasiūlymus dėl studijų programos gerinimo, mokymosi visą gyvenimą užtikrinimo.
4. Ir toliau skatinti darbuotojus atlikti daugiau tarptautinių mokslinių tyrimų, tobulinti pedagoginius įgūdžius.

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