



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vytauto Didžiojo universiteto  
**BIOCHEMIJOS PROGRAMOS (612C73002)**  
**VERTINIMO IŠVADOS**

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**EVALUATION REPORT**  
**OF *BIOCHEMISTRY* (612C73002)**  
**STUDY PROGRAMME**

at Vytautas Magnus University

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Išvados parengtos anglų kalba  
Report language - English

Vilnius  
2013

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<b><i>Biochemija</i></b>
Valstybinis kodas	612C73002
Studijų sritis	Biomedicinos mokslai
Studijų kryptis	Molekulinė biologija, biofizika ir biochemija
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	Biochemijos bakalauras
Studijų programos įregistravimo data	2010-05-11, ISAK Nr. 1-01-44

## INFORMATION ON ASSESSED STUDY PROGRAMME

Name of the study programme	<b><i>Biochemistry</i></b>
State code	612C73002
Study area	Biomedical Sciences
Study field	Molecular Biology, Biophysics and Biochemistry
Kind of the study programme	University studies
Level of studies	first
Study mode (length in years)	Full-time (4)
Scope of the study programme in credits	240
Degree and (or) professional qualifications awarded	Bachelor of Biochemistry
Date of registration of the study programme	Order No. ISAK-1-01-44 of 11 May, 2010

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## I. INTRODUCTION

Vytautas Magnus University (further VMU) was established 1922 as national University of Lithuania in Kaunas, which the capital of Lithuania until the World War II and re-established under current name 1989, when the movement for re-establishing national independence has started. VMU is managed by two collegial bodies, the Council and the Senate, and the separate managerial body of the Rector. The structure of the VMU comprises 13 academic divisions: 10 faculties, Kaunas Botanical Garden, Institute of Foreign Languages and Innovative Studies Institute, 6 university centres and Students' Representative Council.

VMU was the first university in Lithuania which introduced Bachelors', Masters' and Doctoral levels of studies in 1989. Bachelors' studies last 4 or 5 years, Masters' studies – 1,5 – 2 years. Foreign students may choose either one of the 3 full-time Bachelor's Degree or 15 full-time Master's Degree programmes offered in English.

Biochemistry Bachelor Study Programme (further BB SP) at VMU is organized by the Department of Biochemistry and Biotechnologies at the Faculty of Natural Sciences (further FNS). FNS also includes departments of Environmental Sciences, Biology, and Physics, also Centre of Environmental Research. These structural units are also involved in the teaching process of this Programme. The BB SP was started in September 2010, after being accredited by the Centre for Quality Assessment in Higher Education in May, 2010.

### ***Evaluation Team***

The team leader: Prof. in Plant Physiology Halina Gabrys, Dr. habil. Biology Jagiellonian University, Krakow, Poland; team members: Prof. in Microbiology Indriķis Muiznieks, Dr. habil. Biology University of Latvia, Riga; Prof. in Molecular Biology Kari Keinänen, Dr. Biochemistry, University of Helsinki, Helsinki, Finland; Prof. emeritus in Biology and Genetics Radim Brdicka, M.D., Dr. habil., Charles University, Prague, Czech Republic; Prof. in Genetics Ilona Miceikienė, Dr. Biology, University of Health Sciences, Kaunas, Lithuania; student, Mr. Tadas Juknius, University of Health Sciences, Kaunas, Lithuania.

### ***The procedure of the evaluation***

The Self Evaluation Report (hereinafter – SER) of the BB SP was made available to the expert team in end January, 2012. All the members of the expert team examined the SER individually, preparing preliminary reports and indicating problem questions or discussion points. The experts obtained further information during the site visit in Kaunas on February 27 through interviews with Programme co-ordinators, Department heads, senior and junior members of the teaching staff, students, graduates and employers. After the visit, on February 28 the expert group held a meeting, discussed the contents of the evaluation report and agreed upon the numerical evaluation of every section of the evaluation. The draft report was composed through electronic exchange of opinions within the expert team and forwarded to VMU. After receipt of the comments from the VMU the Evaluation Team members prepared final versions of their reports, which were integrated into one document by the team leader.

## II. PROGRAMME ANALYSIS

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

The aims of BB SP as defined in the SER (paragraph 16) are:

1. to provide students with knowledge and understanding of Biochemistry from the fundamentals to the frontiers of the subject;
2. to provide students with the basic scientific, intellectual, and practical training that will prepare them for lifelong learning, and, if they wish, for a career in biosciences research.
3. to enable students to experience a supportive learning environment that fosters their academic and personal development.

Learning outcomes are used in the design of the programme and are clearly specified and harmonised with study programme aims; they are achieved by teaching specific subject courses included in the curriculum. The learning outcomes of the BB SP are defined taking into account corresponding international recommendations. They constitute the aggregate of four descriptor categories: (1) knowledge; (2) cognitive skills; (3) practical skills; (4) transferable skills, including social and personal skills. Each category is subdivided into 4 – 5 outcome groups. Slight differences exist between the outcome descriptors used in VMU study programmes, including the BB SP, and the descriptor pattern provided by the Appendix 2 of the Order of the Minister of Education and Science of the Republic of Lithuania on Approval of the Descriptor of Study Cycles (21 November, 2011 No. V-2212). Nevertheless, it may be concluded that the overall structure of the descriptors is compliant with the national regulations.

Apparently the outcome groups listed under code B (Cognitive skills) and C (Practical skills) have been interchanged, the outcomes under the code “Cognitive skills” clearly belong to the code “Practical skills” and vice versa. Links between BB SP courses and learning outcomes, which are given in table 4 give general, although not fully comprehensive overview how the expected outcomes shall be achieved. Evidently the acquisition of the transferable skill aspects may be addressed in many more study courses than it is reflected in the table. Meanwhile, in the course descriptions, e.g. Calculus I and II, the approaches to evaluate the attainment of course outcomes are described rather formally, referring mostly to knowledge and practical skill descriptors, while the other components, especially transferable skills have obtained disproportionally small, if any, attention, although their expected presence is indicated in the table 4 of the SER. The Evaluation Team would suggest considering possibilities of including into the course descriptions additional learning outcome groups, which may lead to the future activities in the role of employer, not only employee in the labour market.

The information about BB SP is presented in the yearly book published by VMU. This publication, together with presenting video materials and corporate souvenirs, are distributed via school information points. Visitors can also obtain the required information on the VMU Studies Marketing Division as well as on websites of VMU ([www.vdu.lt](http://www.vdu.lt)), VMU FNS (<http://gmf.vdu.lt>) and the Association of Lithuanian Higher Education Institutions LAMA BPO (<http://www.lamabpo.lt/>).

Bachelor programmes in Biochemistry exist in numerous universities worldwide. During the last decade there has been a steady growth in the number of programmes and enrolments to the programmes offering an integrated, transdisciplinary, problem-oriented approach to biochemistry. EU strategic planning documents (e.g., Midterm review of the Strategy on Life Sciences and Biotechnology) confirm the great potential for the development of Biotechnology and related Life Science fields.

The SER refers to the feasibility study performed in 2007 by the Institute of Biotechnology "Top-level specialist training, research and experimental development in science intensive business in the field of biotechnology", which has shown that the demand for

specialists in Lithuanian labour market in the research laboratories of molecular biology and biotechnology, biotechnological companies and commercial organizations especially appreciate specialists of the biochemical profile. The demand for specialists in biotechnological and biopharmaceutical sectors during the period of 2007-2015 is expected to increase more than two times - from 223 to 490, and it will amount to 30.5% of all workers in this sector.

The learning outcomes of the BB SP are assessed every two years. The Study Programme Committee (further SPC), consisting of programme teachers, social partners, students and alumni, is responsible for the assessment and update of the BB SP learning outcomes.

The conferred degree is expected to grant the possibility of continuing studies toward Masters Degree at the VMU or in other universities, but it should be specified to which institutions and which programmes are the graduates eligible.

The first cycle BB SP leads to the qualification Bachelor of Biochemistry on the basis of acquisition of the learning outcomes that are compatible with the qualification offered. The name of the BB SP, its learning outcomes, content and the qualifications offered are compatible with each other.

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

The duration of the BB SP at VMU is 4 years (8 semesters) and the total volume is 240 credits. Programme volume corresponds to the requirements for first cycle programmes, which are set forth by the National regulations "On Approval of Description of General Requirements for Degree Providing First Cycle and Integrated Study Programmes" and Regulation of the Studies in Biochemistry.

In the view of Evaluation Team members, the extended duration of studies needed to obtain the Bachelors degree (four years, instead of three, as in most European countries) may create disadvantages for the Lithuanian students seeking to obtain the qualification, and the prolongation of time spent to obtain the first degree may impede the exchange possibilities with other European universities.

The legal requirements in Lithuania demand that the candidates for the Bachelor (first cycle) degrees must achieve between 210 - 240 European Credit Transfer and Accumulation Scheme (ECTS) credits. The BB SP in VMU leads to award of a Bachelor degree in Biochemistry on the basis of 240 ECTS, which can be obtained during 8 semesters of full time studies. The curriculum design meets the requirements stated in the Order No. V-501 and Regulation of Studies in Biochemistry (RSB) of the Minister of Education and Science, as cited in SER (as shown in Table 5 in SER, pp.11-12). The only and minor exception is that the programme offers 46 credits on study subjects in the field of Chemistry while the RSB states 48 credits. The volume of the practical work and Bachelor Thesis are compliant with the regulations provided by the Ministry of Education and Science.

The Evaluation Team finds room for improvement both in the balance between different subjects in the Curriculum and in its educational and scientific content. First, the amount of study credits devoted to General Subjects (incl. Social Sciences, Humanities, and Languages; total 52 credits) seems unproportionally high, considering that Biochemistry and Biology subjects together make a total of 57 credits of the Programme Essentials, out of which 24 credits can be regarded as core biochemistry (Biochemistry 1-3, Physical Biochemistry). The SPC may consider decreasing the student workload within General Subjects to facilitate introduction of more biochemical topics and the Evaluation Team would advocate before the administration of VMU to support this programme amendment. Also, the Curriculum has quite high content of Mathematics and Physics which, although in compliance with the above-mentioned regulations, could be modified to include more biochemically or biologically relevant examples and approaches. This could improve student motivation and link these subjects more firmly to the

core of the Curriculum. Finally, the contents of the basic biochemistry courses follow standard textbook models with relatively little attention to some key new or growing areas or fields like protein chemistry, proteomics (together with other systems biology approaches), and enzymology.

The SPC may revisit also the distribution of successive courses in the curriculum structure. The Evaluation Team would suggest shifting general courses of Biochemistry and Genetics closer to the beginning of the study plan so that the students get confronted with the core topics of their specialization studies at earlier phase of their studies. Based on discussions the Evaluation team had with students during the site visit in Kaunas, the contents of the Basic Biology course may need to be modernized and some overlaps now existing between the Bioorganic Chemistry and Biochemistry I courses should be reduced. The descriptions of teaching and learning methods follow a very uniform and monotonous pattern of 45 hours of lectures and 30 hours of laboratory work for most subjects. This solid pattern was criticized by both the teachers and the students. The Evaluation Team would suggest leaving more flexibility for establishing proportions of learning methods within study courses, thus avoiding too harsh internal regulations at the level of the University.

As a first level academic Bachelor programme, the BB SP focuses on theoretical and applied topics of the field; it aims to train specialists in Biochemistry. The scope of the theoretical part of the programme leaves a good space for improvements to ensure optimal attainment of the learning outcomes within the given time-frame. The hands-on part of the studies is better designed, research projects during internships/practices and the work upon Bachelors' thesis are planned using modern methods and equipment. The achievements in science are taken into account in a relevant way.

### **3. Staff**

The legal requirements concerning staff are fulfilled with regard to the number of teachers and their general qualifications, however the representation of specialists within the focal study field should be improved. In total, 24 persons are affiliated with the BB SP programme: 10 professors, 9 associate professors and 5 doctors. 21 teachers are employed at VMU and 3 persons elsewhere: 2 lecturers are employed at the Institute of Horticulture, Lithuanian Centre for Agriculture and Forestry and one person is employed at the University of Helsinki. 39% of study field subjects are taught by professors and 44% by docents.

Most of the teachers of General Science subjects of the BB SP programme at VMU have a relevant education and experience in research work, although the target of the scientist participation in teaching speciality subject is not met. In particular, out of 6 persons teaching biochemistry only 2 faculty members have strong research profile in that field. The publications of two professors and two doctors teaching General (3 teachers) and Plant (1 teacher) Biochemistry may be regarded only as related to biochemical methodology, while the analysis of the provided documentation plus data available in internet show, for example, that among the teaching staff there are no specialists focused on two disciplines crucial for biochemistry: Enzymology and Protein Science. At the same time, a brief overview of the literature databases reveals that there are academicians among the staff of VMU, whose profile would complement the structure and expected outcomes of BB SP, but who are not involved in the programme implementation.

The number of teaching staff is sufficient to ensure the intended learning outcomes. According to SER, the teacher-student ratio depends on the subject group and ranges from 80–150 students for General study subjects, through 25–30 students for seminars, 15–25 students for Programme Essentials and Special study subjects to 10–12 students during laboratory classes.

As the BB SP is relatively new, there was no turnover of the teaching staff in the reported period. The only minor change was due to a maternity leave. The average age of teachers is 47,5 years. Three teachers out of 24 are 35 years old, and the youngest staff member is 32. With PhD students participating in practical training, the current age structure of the teaching staff is satisfactory, although, to ensure sustainable teaching/learning processes in the programme, recruitment of young staff members, e.g., from the present PhD students, would be advisable.

The members of the teaching staff are involved in different forms of international co-operation, they participate in joint international projects, research work activities, teaching and/or research inter-university exchange. Each year from 10 to 30% of the programme teachers participate in LLP/Erasmus exchange or use other possibilities (e.g., direct exchange agreements, individual professional relationships) for teaching and research visits to universities in foreign countries, although it should be emphasized again that the focus on the development of the Biochemistry core teaching staff should have received more attention. Since 2010 there have been 16 outgoing (to USA, Finland, Turkey, Croatia, Italy, France, Belgium, UK and Latvia) and 20 incoming (from various scientific institutions in all above mentioned countries plus Switzerland, Netherlands, Poland and Ukraine) staff exchange events. Seminars covering various research topics in biosciences are regularly organized by VMU FNS with participation of researchers from different Lithuanian and foreign universities.

Apart from the reservations of the Evaluation Team concerning insufficient focus on some important branches of Biochemistry, the research activity of the programme staff in their particular fields of specialization is present and reflected in publications. In the period 2010-2012 the teachers of the BB SP programme published 60 research papers, although just 19 of them (less than one paper per staff member per three years period) are reported to be refereed in the ISI Web of Science database. This number appears to be surprisingly small in view of the multiform international cooperation reported, including participation of the staff members in 12 international projects. Noteworthy, three academic textbooks have been published in the period 2010-2012. Altogether 10 textbooks, which can be used in teaching Biochemistry-related subjects in Lithuanian have been published in the last five years.

The staff members are also involved in expert and organizational activities in various areas of science. They participate in 12 international and 20 national projects, coordination of projects, they are members of scientific councils, members of numerous scientific societies, journals' editorial boards etc.

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

Facilities available to and used by the Biochemistry BA Programme are shared with the Molecular Biology and Biotechnology MA Programme and are mainly located in the FNS building. The description of facilities in the respective SERs of these two programmes is also nearly identical. The classrooms, computer classes in the FNS building appeared adequate and in a clean condition. Signs of recent and still ongoing modernization are visible. In addition, classrooms and computer classes situated elsewhere at the University can be used for teaching and studying purposes if needed. According to SER, the conditions in the computer classes and lecture rooms are analyzed on a regular basis. The FNS building is equipped with high-speed internet connections and WiFi zones, which facilitates efficient use of computers for study and research.

The laboratory facilities and equipment in the basic teaching laboratories are partly quite modest and in need of updating. In contrast, many of the specialized laboratories are much better equipped, due to recent substantial investments in laboratory equipment via EU funds. Small size of some laboratories may restrict their efficient use in teaching. Site visit indicated that not all



lab safety measures were strictly followed in teaching laboratories (e.g., the use of safety glasses, gloves). Overall, the classrooms, computer classes and laboratories used by the Programme meet the requirements of student practice.

Library facilities present in the FNS building (Informatics and Natural Sciences Library) and elsewhere in the University (e.g., Central Library) are adequate. The short opening hours (8-10 hours daily) do not, however, support studies during the evenings. The Central Library is also open on Saturdays and during exam periods, on Sundays. The collection of books and journals in the fields of biochemistry, molecular biology and biotechnology is somewhat limited, especially considering the broad nature of the disciplines. Students expressed complaints about books being unavailable due to long reservations by other students.

The library provides an internet access for the staff and students to major electronic databases of scientific literature (from University IP addresses), which is a major asset and to some extent compensates for the insufficiencies in the collections of printed books and journals. Substantial amount of the teaching materials are available in Lithuanian.

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

Association of Lithuanian higher education institutions for joint admission organizes the process of admission to the bachelor study programmes. The process is governed by corresponding law. The number of enrolled state-funded students (years 2010-2012) was decreasing whereas of self-funded increased, but the total remained unchanged. The programme enjoys very high reputation among Lithuanian high-school graduates; every year more than 500 students consider undertaking the Bachelor studies in Biochemistry.

The programme is very broad and elective subjects allow students to shape their own professional future and also to tailor the trajectory by getting experience in practical application. This way learning outcomes are being confronted with real experiments which indicate the necessity to broaden the set of elective subjects.

As most of graduated bachelors will not continue for getting master degree, but decide to start their practical jobs, the ability to solve practical problems with the aid of their knowledge and skill is intensively supported.

ERASMUS programme was not yet utilized, none of the students has used the possibilities of international mobility during 5 semesters of studies by now, although the VMU has developed active contacts with universities from abroad. As it could be concluded from the interviews, the importance of gaining international study experience was not recognized well enough by the students. The Evaluation Team would like to encourage the programme administration to elaborate on strengthening the motivation of students, not looking to eventual financial, social or language constrains that should pay back in increased competitiveness in professional careers of the graduates having international mobility record. Due to the long-term cooperation with the Lithuanian company “Fermentas” (now “Thermo Fisher Scientific”) some students were able to get some practical skills there.

Established system of organizing practical placements is flexible and allows the students to adjust their specialization to labour market demands. Practical tasks are prepared in a way that allows students to apply theoretical knowledge, cognitive and practical skills. Students at the university get versatile individual support not only from the administration but esp. from their teachers and tutors. Experts’ discussion with students was very effective and has shown their interest to optimize their activities. They did complain about a few services – library not opened during the evening.

Students are consulted about career opportunities during the events organized by VMU administration, during the defence of speciality practice, maintaining direct contact with employers, and posting information about available places for practice or advertising job offers. Most of the teachers at the Department also cooperate with social partners, thus they mediate the employment of the students and some of the students, whom the Evaluation Team met, were involved in part-time job activities according to the specialization of their studies.

The assessment of the student achievement seems to be clear, student are satisfied and do not complain about assessment practices. Student assessment system is regulated by VMU study order. The assessment is regarded by the students as being purposeful, constructive, informative, and comprehensive. The specific terms of the assessment are reflected in the study course syllabi. Student workload is recorded in terms of ECTS. To all the graduates a Diploma Supplement will be issued automatically and free of charge according to a template developed by the EC, Council of Europe and UNESCO.

The professional activities of the majority of graduates cannot be assessed since this programme started only in 2010 and there have been no graduations by now.

## **6. Programme management**

The SPC of the BB SP is the major organ responsible for the management, monitoring and assessment of the programme. Decisions made by SPC are approved by Faculty Board and executed by the Department of Biochemistry and Biotechnologies. Close interaction between SPC and the Department is evident as the Head of the Department also acts as the Chair of SPC. The role and activities of SPC are subject to university-level regulations. Biochemistry SPC includes two professors and two other members of the academic staff of the Department of Biochemistry and Biotechnologies, one representative from the Institute of Horticulture (Lithuanian Research Centre for Agriculture and Forestry), and one student member. However, it seems to be little interaction with the Department of Biology, which runs a Masters' programme in Molecular Biology. The SPC organizes regularly an assessment of the programme based on self-assessment materials provided by the Department. It is mentioned in the SER that "teachers and students of the Programme, as well as social partners, are encouraged to provide study Programme update suggestions to the SPC". Based on the analysis of self-assessment materials, the SPC proposes changes to the programme, which are then subjected to a wider discussion involving the Department. There are no previous external evaluations as the programme is quite new. Overall, the responsibilities for decisions and monitoring the implementation of the programme are allocated in a clear manner, and information and data are regularly collected and analyzed, although the methods of exploiting the feedback from students, and employers are still in the process of development.

The procedures for internal quality assurance are defined and consist of an institutional (University) level quality assurance system and its implementation by the institutions at the Faculty level: the SPC, the Faculty board and the Department. The internal analysis and improvement of the programme is primarily the responsibility of the Faculty. The internal quality assurance measures are enabling monitoring of important aspects of teaching process and study programme. Mechanisms to improve the teaching quality are in place. The main instrument of the regular assessment is the periodical survey involving both teachers and students and covering 2-3 study subjects at the end of each semester. The results are analyzed at the departmental level; the role of the SPC should be increased in this process. No examples are given on the changes that may have been introduced to the programme as a result of such procedures. During the site visit, the students expressed their overall satisfaction with the programme, but many felt that the programme is too heavily biased towards mathematics and physics in the first years at the expense of biological subjects, including biochemistry. Thus,

internal evaluations are used as a tool for the continuous improvement of the programme, but their efficiency can be improved.

The quality assurance measures should be used to assist the strategic development of the curriculum according to the needs of a changing world, e.g., introduction of new approaches into the teaching process and changes in curriculum structure. Too high concentration on the individual components of the programme (processes) taken alone may be less productive.

The Evaluation Team learned during the visit that the Department of Biochemistry and Biotechnologies will be divided into two Departments and a new BA programme in Biotechnology will be launched soon. Such a decision is likely to have a strong influence on the current BA programme in Biochemistry and naturally its implications should have been discussed in the SER.

### III. RECOMMENDATIONS

With regard to the goals of the development of the Bachelor's Study Programme in Biochemistry at the VMU towards national and international recognition, the Expert Team would like to recommend the SPC, the SER preparation team and the administration of the VMU to consider the following activities:

1. including into the course descriptions additional learning outcomes related to the future activities in the role of employer, not only employee in the labour market;
2. decreasing the student workload within general subjects, provided by the other faculties of the VMU, as well as within Mathematics and Physics, which are overrepresented in the BB SP structure in comparison to the regulatory framework provided by the Ministry;
3. including, introduction to Omic-technologies (Systems Biology) and Enzymology into the curriculum, increasing the content of Protein Biochemistry part within the courses of Basic Biochemistry; Bioinformatics part within the course of Biostatistics and Bioinformatics;
4. providing more flexibility in distribution of contact hours between lectures, laboratory work and self learning within the courses, seeking for the possibilities to increase student practical skills;
5. employing additional teaching staff members who would be specialists in Enzymology and Protein Biochemistry;
6. supporting and encouraging the staff to more active publishing in international scientific journals in order to strengthen the concept of research based training, and to explore possibilities of using sabbatical leave to foster staff engagement in international research cooperation;
7. investing into the modernization of the basic teaching laboratories;
8. promoting student international mobility using EASMUS programme and to provide more possibilities to the students to improve their English language command as a prerequisite for successful study periods abroad;
9. facilitating cooperation between Biology departments and their SPCs in quality assurance and development of the study programmes they provide;
10. reconsidering the sensibility of further fragmentation of the Biology study programmes at the Bachelors' study level and of the relevant departmental structures, as this may turn out to be contra-productive in the context of steadily developing interdisciplinary research and technologies.

#### IV. SUMMARY

The BB SP was started in September 2010, after being accredited by the Centre for Quality Assessment in Higher Education in May, 2010. It is organized by the Department of Biochemistry and Biotechnologies at the FNS. Bachelor programmes in Biochemistry exist in numerous universities worldwide. During the last decade there has been a steady growth in the number of programmes and enrolments to the programmes offering an integrated, transdisciplinary, problem-oriented approach to biochemistry.

The aims of the programme are clearly specified; its learning outcomes are used in the design of the programme and harmonised with study programme aims; they are achieved by teaching specific subject courses included in the curriculum. The SER contains some misleading and incomplete data considering learning outcomes; methods for their attainment and evaluation. The reflection of study subject outcome structure in the syllabi of various courses is not comprehensive. The Evaluation Team would suggest considering possibilities of including into the course descriptions additional learning outcome groups, which may lead to the future activities in the role of employer, not only employee in the labour market.

The name of the BB SP, its learning outcomes, content and the qualifications offered are compatible with each other. In the view of Evaluation Team members, the extended duration of studies, needed to obtain the Bachelors degree (four years, instead of three, as in most European countries) may create disadvantages for the Lithuanian students seeking to obtain the qualification, and the prolongation of time spent to obtain the first degree may impede the exchange possibilities with other European universities.

The BB SP in VMU leads to award of a Bachelor degree in Biochemistry on the basis of 240 ECTS, which can be obtained during 8 semesters of full time studies. The curriculum design meets the legal requirements in terms of volume of the programme. The curriculum content is appropriate for the achievement of the intended learning outcomes, although the Evaluation Team would like to suggest several amendments aiming to provide more focus on essential topics of modern Biochemistry at the costs of the subjects, which are less related to the intended specific outcomes of the programme. The SPC may revisit also the distribution of successive courses in the curriculum structure. The achievements in science are taken into account in a relevant way. Research projects during internships/practices and at planning the work upon Bachelors' Thesis are considered and planned using modern methods and equipment.

The legal requirements concerning staff are fulfilled with regard to the number of teachers and their general qualifications. In total, 24 persons are affiliated with the BB SP: 10 professors, 9 associate professors and 5 doctors. Teachers of the BB SP at VMU have a relevant education and experience in research work. However, the target of the scientist participation in teaching speciality subject is not met. In particular, out of 6 persons teaching biochemistry only 2 faculty members have a documented research record in that field. The BB SP teachers are involved in various forms of international cooperation; they participate in joint international projects, research work activities, teaching and/or research inter-university exchange. The annual participation in the ERASMUS mobility among the programme teachers is high, up to 30% per year; meanwhile the students still have not familiarized this substantial instrument of the internationalization and quality improvement of the studies. In the period 2010-2012 the teachers of the BS SP published only 19 papers which are refereed in the ISI Web of Science database. Although the staff members are involved in expert and organizational activities in various areas of science, the performance in publishing has a considerable space for improvements.

Library facilities are adequate, but the short opening hours (8-10 hours daily) do not support studies during the evening. The laboratory facilities and equipment in the basic teaching laboratories are fairly modest and in need of some updating. In contrast, many of the specialized

laboratories were much better equipped, due to recent substantial investments in laboratory equipment via EU funds.

The programme enjoys very high reputation among Lithuanian high-school graduates; every year more than 500 students consider undertaking the Bachelors studies in Biochemistry. The assessment of the student achievement seems to be clear, students are satisfied. Student assessment system is regulated by VMU study order. The specific terms of the assessment are reflected in the study course syllabi. Student workload is recorded in terms of ECTS. To all the graduates a Diploma Supplement will be issued automatically and free of charge according to a template developed by the EC, Council of Europe and UNESCO. The professional activities of the majority of graduates cannot be assessed since this programme started only in 2010 and there have been no graduations by now.

The procedures for internal quality assurance are defined and consist of an institutional (University) level quality assurance system and its implementation by the institutions at the Faculty level: the SPC, the Faculty board and the Department. The internal analysis and improvement of the programme is primarily the responsibility of the Faculty. The internal quality assurance measures are enabling monitoring of important aspects of teaching process and study programme. Mechanisms to improve the teaching quality are in place. The main instrument of the regular assessment is the periodical survey involving both teachers and students and covering 2-3 study subjects at the end of each semester. The results are analyzed at the departmental level, but for unclear reasons, not by the SPC. The quality assurance measures should be used to assist the strategic development of the curriculum according to the needs of a changing world, e.g., introduction of new approaches into the teaching process and changes in curriculum structure. Too high concentration on the individual components of the programme (processes) taken alone may be less productive.

## V. GENERAL ASSESSMENT

The study programme *Biochemistry* (state code – 612C73002) at Vytautas Magnus University is given **positive** evaluation.

*Study programme assessment in points by fields of assessment.*

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	2
3.	Staff	2
4.	Material resources	3
5.	Study process and assessment (student admission, study process student support, achievement assessment)	3
6.	Programme management (programme administration, internal quality assurance)	3
	<b>Total:</b>	<b>16</b>

\*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. Halina Gabrys

Grupės nariai:  
Team members:

Prof. Indrikis Muiznieks

Prof. Kari Keinänen

Prof. Radim Brdicka

Prof. Ilona Miceikienė

Tadas Juknius

<...>

## V. APIBENDRINAMASIS ĮVERTINIMAS

Vytauto Didžiojo universiteto studijų programa *Biochemija* (valstybinis kodas – 612C73002) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	2
3.	Personalas	2
4.	Materialieji ištekliai	3
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	3
	<b>Iš viso:</b>	<b>16</b>

\* 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

BB SP pradėta dėstyti 2010 m. rugsėjį, prieš tai tų pačių metų gegužę akreditavimus studijų programą Studijų kokybės vertinimo centre. Programą vykdo Gamtos mokslų fakulteto (GMF) Biochemijos ir biotechnologijų katedra. Biochemijos bakalauro programos dėstomos daugelyje pasaulio universitetų. Per pastarąjį dešimtmetį tokių integruotų, tarpdisciplininių, į biochemijos problemas orientuotų programų ir į jas priimtųjų skaičius nuolat auga.

Programos tikslai yra aiškiai apibrėžti; jos studijų rezultatai atitinka programos struktūrą ir dera su studijų programos tikslais; rezultatų pasiekama dėstant specialių dalykų kursus, įtrauktus į studijų turinį. Tačiau savianalizės suvestinėje pateikiama klaidingų ir neišsamių duomenų apie studijų rezultatus, jų siekimo ir vertinimo metodus. Studijų dalykų rezultatų struktūra iki galo neatsispindi įvairių kursų programose. Vertinimo grupė siūlytų apsvarstyti galimybes įtraukti į dalykų aprašus papildomas studijų rezultatų grupes, kurios ateityje darbo rinkoje leistų atlikti ne tik darbuotojo, bet ir darbdavio vaidmenį.

BB SP pavadinimas, jos studijų rezultatai, turinys ir suteikiama kvalifikacija dera tarpusavyje. Vertinimo grupės narių požiūriu, išžėsta studijų trukmė, reikalinga bakalauro laipsniui gauti (ketveri metai vietoje trejų metų, kaip yra daugelyje Europos šalių), šios kvalifikacijos siekiantiems Lietuvos studentams gali būti nenaudinga, o ilgas laikas, skirtas pirmosios studijų pakopos laipsniui įgyti, gali apsunkinti mainų su kitais Europos universitetais galimybes.

VDU BB SP biochemijos bakalauro laipsnis suteikiamas už 240 ECTS, kuriuos galima surinkti per 8 nuolatinių studijų semestrus. Studijų turinys atitinka programos apimčiai keliamus teisinius reikalavimus. Nors studijų turinys yra tinkamas numatomiems studijų rezultatams pasiekti, vertinimo grupė norėtų pasiūlyti kelias pataisas, kurios su konkrečiais programos mokymosi rezultatais mažiau susijusių dalykų sąskaita leistų labiau sutelkti dėmesį į esmines

šiuolaikinės biochemijos temas. Be to, SPK galėtų peržiūrėti vienas po kito einančių dalykų paskirstymą studijų turinio struktūroje. Į mokslo pasiekimus atsižvelgiama tinkamai. Mokslinių tyrimų projektai, vykdomi studentiškos praktikos metu ir planuojant bakaluro darbo rašymą, atliekami ir planuojami naudojant šiuolaikiškus metodus bei įrangą.

Pagal dėstytojų skaičių ir jų bendrąsias kvalifikacijas darbuotojai atitinka jiems keliamus teisinius reikalavimus. Iš viso BB SP dėsto 24 asmenys: 10 profesorių, 9 docentai ir 5 mokslų daktarai. VDU BB SP dėstytojai turi tinkamą išsilavinimą ir mokslinio darbo patirtį. Tačiau tikslas, kad specialybės dalyką dėstyti mokslininkai, nepasiektas. Pavyzdžiui, iš 6 biochemiją dėstančių asmenų tik 2 fakulteto nariai turi dokumentais patvirtintas pažymas apie vykdytus šios srities mokslo tyrimus. BB SP dėstytojai dalyvauja įvairių formų tarptautinio bendradarbiavimo veikloje, jungtiniuose tarptautiniuose projektuose, mokslinio darbo veikloje, tarpuniversitetiniuose dėstytojų ir (ar) mokslo tyrimų mainuose. Daug programos dėstytojų kasmet dalyvauja ERASMUS mobilumo programoje – iki 30 % per metus; tuo tarpu studentams ši pagrindinė studijų tarptautiškumo ir kokybės gerinimo priemonė vis dar mažai žinoma. 2010-2012 m. BS SP dėstytojai publikavo tik 19 darbų, kurie skelbiami Mokslinės informacijos instituto duomenų bazėje „ISI Web of Science“. Nors akademinio personalo nariai dalyvauja įvairių mokslo sričių ekspertinėje ir organizacijų veikloje, mokslo darbų publikavimo srityje jiems dar yra ko siekti.

Bibliotekos patalpos įrengtos tinkamai, tačiau trumpas bibliotekos darbo laikas (8-10 val. kasdien) ne į naudą studijuojantiems vakarais. Pagrindinių mokymo laboratorijų patalpos ir laboratorinė įranga yra gana kuklios ir reikalauja atnaujinimo. Tačiau daugelis specializuotų laboratorijų, priešingai, yra kur kas geriau įrengtos – tam turėjo įtakos neseniai iš ES fondų gautos didelės investicijos laboratorinei įrangai įsigyti.

Tarp Lietuvos vidurinių mokyklų abiturientų ši programa yra labai populiari, kasmet biochemijos bakaluro studijas renkasi daugiau kaip 500 stojančiųjų. Studentų pasiekimų vertinimo sistema atrodo aiški, studentai patenkinti studijomis. Studentų vertinimo sistema reguliuojama vadovaujantis VDU studijų reguliavimu. Konkrečios vertinimo sąlygos atsispindi studijų kurso programoje. Studentų mokymosi krūvį reglamentuoja ECTS. Pagal EB, Europos Tarybos ir UNESCO parengtą reglamentą, visiems absolventams bus automatiškai ir nemokamai išduodamas diplomo priedas. Daugumos absolventų profesinės veiklos vertinti negalima, kadangi ši programa pradėta vykdyti tik 2010 m. ir iki šiol dar nėra ją baigusiuju.

Apibrėžtas vidinio kokybės užtikrinimo procedūras sudaro institucinio (universiteto) lygio kokybės užtikrinimo sistema, kurią institucijos įgyvendina fakulteto lygiu per SPK, fakulteto tarybą ir katedrą. Atsakomybė už programos vidinę analizę ir gerinimą pirmiausia tenka fakultetui. Vidinio kokybės užtikrinimo priemonės leidžia stebėti svarbius dėstytojų proceso ir studijų programos aspektus. Veikia dėstytojų kokybės užtikrinimo mechanizmai. Pagrindinė reguliaraus vertinimo priemonė yra periodinė apklausa, kurioje dalyvauja tiek dėstytojai, tiek studentai, ir kuri kiekvieno semestro pabaigoje apima 2-3 studijų dalykus. Rezultatai analizuojami katedros lygiu, tačiau dėl neaiškių priežasčių to kažkodėl nedaro SPK. Kokybės užtikrinimo priemonės turėtų būti naudojamos kaip studijų turinio strateginės plėtros pagalba, teikiama atsižvelgiant į besikeičiančius pasaulio poreikius, pvz., reikia naujo požiūrio į dėstytojų procesą ir studijų turinio struktūros pokyčių. Pernelyg susikoncentruoti vien į atskirus programos (procesų) komponentus gali būti neproduktyvu.



### III. REKOMENDACIJOS

Atsižvelgdama į tai, kad VDU biochemijos bakalauro studijų programos kūrimo tikslas yra siekti jos pripažinimo šalies ir tarptautiniu mastu, ekspertų grupė norėtų rekomenduoti Studijų programos komitetui (SPK), savianalizės ataskaitą (SAA) rengusiai grupei ir VDU administracijai apsvarstyti šias galimybes:

1. Papildyti studijų dalyko aprašus mokymosi rezultatais, susijusiais su būsimu ne tik darbuotojo, bet ir darbdavio vaidmeniu darbo rinkoje;
2. Sumažinti studentams tenkanti kituose VDU fakultetuose dėstomų bendrųjų dalykų, taip pat matematikos ir fizikos mokymosi krūvį, kuriam, palyginti su Švietimo ir mokslo ministerijos pateikiama normine baze, biochemijos bakalauro studijų programos (BB SP) struktūroje skiriamas per didelis dėmesys;
3. Įtraukti į mokymo programą įvadą į -omikų technologijas (sistemų biologiją) ir enzimologiją, biochemijos pagrindų kurse didinti baltymų biochemijos turiniui tenkančią dalį, o biostatikos ir bioinformatikos kurse – bioinformatikos dalį;
4. Lanksčiau skirstyti kontaktines valandas tarp įvairių kursų paskaitų, laboratorinių darbų ir savarankiško mokymosi, taip siekiant sudaryti galimybes studentų praktiniams įgūdžiams pagerinti;
5. Papildomai įdarbinti akademinio personalo narių, kurie būtų enzimologijos ir baltymų biochemijos specialistai;
6. Skatinti akademinį personalą aktyviau publikuoti savo darbus tarptautiniuose moksliniuose žurnaluose ir padėti jam tai daryti, idant būtų stiprinama mokslo tyrimais paremta mokymo koncepcija, ir išsiaiškinti, kaip būtų galima išnaudoti kūrybines atostogas personalo dalyvavimui tarptautinio mokslinio bendradarbiavimo veikloje skatinti;
7. Investuoti į pagrindinių mokomųjų laboratorijų modernizavimą;
8. Skatinti studentų tarptautinį mobilumą, naudojantis ERASMUS programa, ir sudaryti studentams daugiau galimybių pagerinti anglų kalbos žinias kaip būtiną sėkmingo studijų laikotarpio užsienyje sąlygą;
9. Palengvinti biologijos fakulteto katedrų ir jų SPK bendradarbiavimą kokybės užtikrinimo ir jų rengiamų studijų programų klausimais;
10. Iš naujo apsvarstyti jautrų klausimą – bakalauro laipsnį suteikiančių biologijos studijų programų ir atitinkamų fakultetų struktūrų atskyrimą, nes nuolat besivystančių tarpdisciplininių mokslo tyrimų ir technologijų kontekste visa tai gali neatnešti norimos naudos.

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