



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO
STUDIJŲ PROGRAMOS *BIOMECHANIKA*
(valstybinis kodas – 612H15002)
VERTINIMO IŠVADOS**

**EVALUATION REPORT
of STUDY PROGRAM *BIOMECHANICS*
(state code – 612H15002)
STUDY PROGRAM
at VILNIUS GEDIMINAS TECHNICAL UNIVERSITY**

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Išvados parengtos anglų kalba
Report language – English

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Biomechanika</i>
Valstybinis kodas	612H15002
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	Biomechanikos inžinerijos bakalauras
Studijų programos įregistravimo data	1997-05-19

INFORMATION ON EVALUATED STUDY PROGRAM

Title of the study program	<i>Biomechanics</i>
State code	612H15002
Study area	Technological Sciences
Study field	General Engineering
Type of the study program	University studies
Study cycle	First
Study mode (length in years)	Full-time (4)
Volume of the study program in credits	240
Degree and (or) professional qualifications awarded	Bachelor of Biomechanical Engineering
Date of registration of the study program	19/5/1997

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I. INTRODUCTION

1.1. Background of the evaluation process

The evaluation of on-going study programs is based on the **Methodology for evaluation of Higher Education study programs**, 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 programs 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 an external evaluation report of the study program, SKVC takes a decision to accredit the study program either for 6 years or for 3 years. If the program evaluation is negative, such a program is not accredited.

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

The program 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 program is **not accredited** if at least one of the 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	Analysis of description of subject
2	Biomechanics_M_changes_in_LO_since_2016
3	Additional information on academic staff
4	Additional information on Study Field Descriptors

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

Vilnius Gediminas Technical University (VGTU) is a state university, which is one of the largest higher education institutions in Lithuania, and one of the leading universities in the Baltic States. VGTU has 10 faculties. The 4 year-long undergraduate study program on Biomechanics was

founded in 1997, it is organized by the Department of Biomechanics within the Faculty of Mechanics in cooperation with the Institute of Mechanical Science. Graduates with a Bachelor of Biomechanical Engineering degree can continue their studies in Master programs on Biomechanics, Mechanical Engineering and related fields, or work in the field of engineering in health care and rehabilitation. The study program provides a solid basis on theoretical knowledge, engineering applications, as well as a practical training phase in industries as stipulated in the curricular rules.

A previous external evaluation of the study program was carried out in March 2012 by the international expert group formed by SKVC. The Biomechanics study program for undergraduates was accredited until 31 August 2018. The internal evaluation of the study program is continuously performed by the Study Committee (minimum twice per year).

1.4. The Review Team

The review team was completed according *Description of expert' recruitment*, approved by order No. 1-01-151 by the Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on 28th April 2016.

1. **Prof. dr. Udo Nackenhorst (team leader)**, *Head of the Institute for Mechanics and Computation Mechanics at Leibniz University Hannover, 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. PROGRAM ANALYSIS

2.1. Program aims and LOs

The program aims and learning outcomes (LOs) are clear, visible and readable on different websites of VGTU for applicants, students, and employees (available in English as well). The program aims and LOs were prepared in accordance with national legal requirements and with

European standards. The aims are well defined to provide students' knowledge on physical and technological sciences, fundamentals of biomechanical engineering science, theoretical fundamentals of occupation and to form skills needed for engineering work, to develop a need to be interested in the novelties of biomechanical engineering science, to apply acquired knowledge in the practice of medical, rehabilitation and orthopedic companies, to develop wide erudition, ability to observe and critically analyze, creatively solve technical, administrative and juridical aspects of the design, manufacturing and maintenance of medical and rehabilitation equipment, to perceive the influence and importance of made decisions on the development of society, continuously develop professional qualification and maintain competence throughout life-long learning.

Based on the recommendations from the previous external evaluation of the program, the curriculum, the study plan, study aims and LOs are well described and categorized into five groups (knowledge and its applications, ability to perform research, special skills, social skills, personal skills) (Table 8.3.1 within the self-evaluation report (SER), which is in compliance with the Order of the Minister of Education and Science of the Republic of Lithuania on Approval of the Description of Study Cycles (Appendix 1). Latest EUR-ACE Framework Standards for the Accreditation of Engineering programs formulated in 2015 divides LOs into 8 groups, however, the LOs of the Biomechanics program at VGTU (see Table 2 within the SER) could also be grouped in accordance with the EUR-ACE Standards (see Paragraph 26).

The number of medical institutes and companies in the field of medical equipment increases continuously, thus the market for jobs is increasing. The development of manufacturing and design processes could engage highly qualified specialists. The annual number of graduated students is 15-20 (Table 14 within the SER), which is around 57% of enrolled students (27-33). 10% of students start working from the 5th semester, and 77.3% of graduates are employed within the field of their speciality. The program is very much oriented towards needs of local medical services as well as business. The study program clearly considers the needs of Lithuanian labour market as well as connection to different MSc program.

The programme aims and LOs are consistent with the requirements of BSc degree; the ratio of theoretical and practical knowledge is well equilibrated.

The name of the study program *Biomechanics* appears too narrow, and does not reflect precisely the content of the study program. For example, the original subject Biomechanics is assigned 7 ECTS credits only. The title of program will be changed to *Medical Engineering* in the near future. However, the review team recommends the title *Biomechanical Engineering*, which will better reflect the actual content of the study program (the program is based on a mechanical engineering program background with biological and medical aspects).

Strengths: The program aims and LOs were prepared in accordance with national legal requirements and with European standards, and they are compatible with study aim and LOs of different European Universities. The BSc study program has developed continuously taken into account the comments of previous evaluation report.

Weakness: The name of the study program *Biomechanics* is relatively narrow comparing to the broader educational aims, intended LOs, study plan and subjects.

2.2. Curriculum design

The curriculum of the program meets national requirements as summarized in the Orders of the Minister of Education and Science of the Republic of Lithuania: “On the Approval of the Description of the General Requirements for the Awarding Degree First Cycle and Integrated Study Programs” (9 April, 2010, No. V-501) and “On the Approval of the Description of the Higher Education Cycles” (21 November, 2011, No. V-2212).

The study program is 4 years long (8 semesters), which is equivalent to 6400 working hours (2641 contact hours – 41.26% of program extent). 51.34% of contact hours are lectures, 15.9% laboratory work and 23.17% practice and 9.5% of independent choice.

The curriculum design provides a solid foundation of mathematical, natural science and general engineering skills; the ratio of different fields is suitable. Based on the analysis of the program, the following can be concluded: the first part of studies focuses on the introduction into engineering sciences (mathematics, chemistry, material sciences, programming), and the second part of studies on the introduction into medical and biomechanical sciences.

The volume of the whole program is 240 credits. It means that 1 ECTS credit is computed as an equivalent to 26.7 working hours. There are no more than 7 subjects per semester. The study program consists of three parts: general academic subjects, study area subjects, and specialization subjects. 15 ECTS credits are on subjects of common training such as the general academic subjects (Politics, Philosophy, Development and Languages). A predominant part (187 credits) of the study program consists of the study area subjects. This part consists of the subjects of general theoretical basics (36 credits), including Mathematics (21 credits), Physics (10 credits), and Chemistry (5 credits), other subjects of general basics (34 credits), main subjects of general and mechanical engineering (45 credits), subjects of social sciences (11 credits), special subjects of biomechanical and mechanical engineering (28 credits) including Anatomy and Physiology (5 credits), Biomechanics (7 credits) and Medical Equipment (8 credits), professional practice (15 credits) divided into three subjects and final work (18 credits) divided into three subjects. The part of specialization consists of 30 credits of optional subjects assigned for a deeper specialization and 8 credit subjects chosen by students independently. The curriculum of study meets the legal

requirements for the first degree studies. The study is controlled by continuous and very strict evaluation of students' performance. Guidance by the teaching staff is very intensive.

The study plan is consistent, the general theoretical subjects, subjects of general basics, the main subjects and some part of special subjects are studied together with students of mechanical engineering. The study plan appears to be well-structured; it includes theoretical and professional subjects in an appropriate ratio. It is consistent with the type (Biomechanics) and with the bachelor degree level of studies. However, the study area and specialization subjects are taught from the beginning of the 5th semester, which appears to be late. It is recommended that some study area subjects (for example Introduction to Biomechanics) are scheduled earlier, in the first two semesters.

The analysis of subject description (course card in Appendix 8.4 within the SER) is presented well. All subjects are summarized in course cards. Based on the description of subjects (Appendix 8.4 within the SER) it is concluded that there is no repetition in the content of different subjects. The aim of study and the study plan reflect the latest achievements in science and technologies suitable for bachelor level education. Most of the main references are after 2000, and 1-2 international references are given in the reference list of most subjects. The content and scope of subjects are sufficient for LOs (Summary in Appendix 8.3 within the SER).

Based on the analysis of bachelor thesis and different homeworks during the site visit, the program focuses on applied research based program aims and LOs. It could be considered to involve BSc students into scientific research during the last semesters, which could strengthen the development of a research oriented first cycle study program.

Based on discussion with students during the site visit, it is recommended to increase and strengthen cooperation with social partners, in particular with hospitals. The students are provided with professional practice; however, it needs to be regularly updated, including renewal of connections with partners. Students have recommended more active teaching methods like the ones they experienced from some incoming lecturers, who can focus on hands-on engineering. It is furthermore recommended to include some ethical aspects as well with regard to medical as engineering aspects. Thus, the review team all in all appreciates the efforts in this program to invite international guest lecturers and recommends intensifying these measures. As the ratio of outgoing students is still quite low, it is recommended to provide some structured and motivating information on that important issue already in the early stage of studies (e.g. integrated within the planned introduction classes), as semesters abroad and even summer school participation have to be planned long in advance.

Strengths: The curriculum of the study program meets national and European requirements for first cycle study programs. The 8-semester study plan is consistent and well-structured; it

includes theoretical and professional subjects in an appropriate ratio. The general theoretical subjects, subjects of general basics, main subjects and one part of special subjects are studied together with students of mechanical engineering.

Weakness: The study plan is focused on applied industrial problems based program aims and LOs rather than scientific research. The Faculty may consider introducing a research oriented first cycle study program.

2.3. Teaching staff

The program is implemented by 61 university teachers (6 professors – 9.8%, 20 associate professors – 32.8%, 22 lecturers – 36.1%, 11 assistants – 18.0%, 1 PhD student and 1 Junior Researcher – 1.6%) (corrected Table 9 within the SER) of six VGTU faculties, i.e. the university teachers of the Faculty of Business Management, the Faculty of Creative Industries, the Faculty of Electronics, the Faculty of Environmental Engineering, the Faculty of Mechanics, and the Faculty of Fundamental Sciences. In comparison to most universities in Western Europe, the number of professors is rather low and the number of associate professors is rather high. On basis of analysis of the demographic structure of the teaching staff (Table 9 within the SER), the average age of teachers is 43.5 years, the average length of teaching experience is 14.5 years. In total there are 6 professors, 5 of which are over the age of 60 (up to 70). The average age of associate professors is about 45 years. A detailed analysis shows that 34 classes out of 60 classes (57%) are presented by professors or associate professors, which meets the legal requirements. In the next years an important task is to increase the number of young full professors to overcome the demographic change.

The host department of the study program is the Department of Biomechanics with 12 staff (1 professor emeritus – 8.75%, 4 associate professors – 33.3%, 4 lecturers – 33.3%, 3 assistants – 25%). The head of department is a young, very committed and professional associate professor. At the time of the audit, there are no full professors at the department; however, as the review team has been informed during the site visit, the transition of the head of department to a full professor is in preparation. This for sure is judged to be very important as a minimum, especially for the international visibility of the program.

20 classes are presented by the staff of the host department; 22 classes out of 27 classes, consisting of main study field subjects (B3), special subjects (B5), professional practice (B6), final thesis (B8) and some specialization subjects (C) (special courses), are presented by the staff of the host department (82%). 16 subjects are carried by 4 staffs To the review team the staff appears to be overloaded with teaching. Fortunately, as it has been demanded in the previous evaluation report, the department managed to claim for the right on PhD education. It is a good and common practice

that PhD students are involved in academic teaching; this should be strengthened for the future of this program.

The total number of students is rather small (103 students). It is recommended to increase the total number of students. The ratio of students/professors is 1.7 as presented in Table 5 within the SER; it promises an outstanding mentoring ratio. However, most of the teaching staff is involved in other study programs too. Nonetheless, if one concludes that four engaged university teachers are responsible for 25-30 students, the student to teacher ratio is still very good compared to European universities.

Most of the teaching staff is highly engaged in university education, which has been boosted by the implementation of an EU funded project on academic education.

Students and teachers of the Faculty of Mechanics participate in Erasmus and other exchange programs. The staff of the Department of Biomechanics act in accordance with the Erasmus exchange program (Tables 5 and 6 within the SER). Most incoming visitors arrived from, but not limited to, Bialystok University of Technology, Bialystok, Poland. It is highly appreciated by the review team that incoming guest lecturers broaden the mind of students with regard to the latest research and teaching methods. The managers of the program should proceed by intensifying these measures.

Most scientific publications in the fields of bioengineering and biomechanics are published in national (university) journals (e.g. Journal of Vibroengineering, Mechanika); only few articles are published in international media (Acta of Bioengineering and Biomechanics, Journal of Mechanics in Medicine and Biology), and no publication has been found in world leading journals (for example Annals of Biomedical Engineering, Journal of Biomechanics, Clinical Biomechanics, Gait and Posture, Medical Engineering and Physics). Few scientists involved in the program attend different international biomechanical and bioengineering conferences (IFAC, IEEE, ISBS). It is recommended to the teaching staff to strengthen their efforts on going abroad, joining leading international conferences organized by biomechanics and biomechanical engineering societies worldwide (such as International Society of Biomechanics, IASTED etc.), grasping the latest trends of research activities in this field of expertise. It is judged to be an important issue to plug in the latest trends of research into this promising study program in order to foster its international visibility and, even more importantly, to educate the future generation on latest technologies to be implemented in the Lithuanian society.

The teachers appear rather as generalists well prepared for this first cycle education program. A slow development can be observed in the last years; the teachers are involved in specific studies and they are focusing on specific fields of scientific specialization. This trend is highly appreciated by the review team. The Government, the university and social partners should

be motivated to assist this engaged team to foster specific research activities, to provide financial aids for participation at world conferences and for the release of teaching and administrative duties. The development of a certain threshold of scientific expertise is needed, for example to claim for fundraising from European systems for research. An additional recommendation is to foster the mandatory level of scientific writing and communication skills in English language, which has been experienced to be well developed for students.

Strengths: Young staff members are very motivated for teaching. Teachers of the host department are responsible for 25-30 students, thus the student to teacher ratio is very good.

Weaknesses: The number of young professors is rather low; the most important subjects are taught by four academic staff members. Academic staff members are less visible in terms of international research, of leading scientific organization and of international publications.

2.4. Facilities and learning resources

Quite small classes are attracted for this programme. Basic engineering study modules are taught together with students from other programmes. Major lectures take place in classrooms of Faculty of Mechanical Engineering. The study program proceeds in the same building for the bachelor and master students. Technical equipment for lecture halls and computer classrooms is on a state of the art level. Modern equipment, like CNC centres and 3D printing, is available for state of the art education. In some fields of minor importance for this program, e.g. machine elements, rather old-fashioned practical demonstrators have been presented to the review team; on these specific topics the program organizers should be sensitized to renew some classes in the study program. Study specific laboratory equipment is growing slowly, but the equipment in the biomechanics lab for the moment appears suitable for first cycle university education. Social partners are engaged to complement the equipment of the department and students can use laboratories of other departments. An improvement of site laboratory equipment is recommended that it could be a basis for qualitative research of research oriented first cycle study programme in the future. Investments in that direction, i.e. installation of some specific technical equipment, will open fund raising opportunities, not only from local social partners and other national funds.

The library is well equipped with related textbooks and with specific scientific journals (e-journals). The opening times of the library and the online booking systems are adequate. Additional course specific materials have been worked out by the academics in Lithuanian language, which are made available via internet by VTGU (Moodle system) to be accessed by student ID.

The review team experienced that students in general are satisfied with the facilities provided for this program. Nonetheless, the review team recommends to enhance e-learning

activities, especially with regard to the experience that Lithuanian students seek employment besides their full time studies already in an early stage of their studies.

Strengths: The library is well equipped with related textbooks and with specific scientific journals (e-journals). In the last few years the number of e-courses and e-assessments has been increased, which is a good help for students.

Weakness: The basis for qualitative research and teaching could be improved. It is recommended to develop the equipment by involving different fundraising schemes and social partners.

2.5. Study process and students' performance assessment

The admission process for the study program is well described and managed by a central institution in Lithuania. The timetable of semesters, organization of the program, the program aims and LOs appear to be sufficient. The performance of students is measured continuously during exams and practice tests, it is approved by VGTU Senate. The rules show similarities to the rules of the study program of Mechanical Engineering, because a part of subjects are taught together for both student groups.

The course cards are very well and strictly organized and sketch not only the most important dates of the course, but the LOs, the topics of lecturers, exercises, laboratories, independent works and assessment methods of students' achievements and evaluation system as well.

The subjects of final thesis correspond to the *Biomechanics* study programme aims and learning objectives. The bachelor level program is designed to educate professionals for industrial practice and to prepare them for subsequent master study programs. Title and topics of final works are properly connected to industrial problems based on program aims and LOs (Table 8.7.2. within the SER). During the bachelor's degree granting evaluation in the committee meetings the discussed issues are: the final assessment of the supervisor, reviewer's assessment and comments; quality of the thesis (final work relevance to the study program, the novelty and relevance of the topic, size, appearance, citing manner, findings), defence (fluency, visual presentation, answers to the questions of the committee members); the assessment of the committee members. The assessment of the final work is constituted of the average grade of all committee members in a ten-point scale.

VGTU has ERASMUS bilateral contracts with several European universities, which provides opportunities for students (and teachers) to join mobility programs, to study several semesters at different European universities. Students are encouraged to join mobility programs, which are strongly recommended by teachers. As already outlined before, the review team recommends continuously increasing efforts for the international mobility of students and teachers of this program.

The review team experienced from their interview with graduates, social partners and employers, that all the parties are satisfied with the first cycle bachelor-program. Nonetheless, the review team recommends broadening the mind of all related partners to improve the program for international visibility. In comparison to the (for sure limited) experience of the review team with other study programs in Lithuania, this specific program provides a potential to become a center in the specific field of biomechanical engineering within the Baltic region and to become visible in the international scene of science.

Strengths: The timetable of semesters, organization of the program, the program aims and LOs appear to be very well designed. The course cards are very well organized and sketch the most important dates of the course, the LOs, the topics of lecturers, exercises, laboratories, independent works and assessment methods of students' achievements and evaluation system as well. ERASMUS bilateral contracts with several European universities provide opportunities for students (and teachers) to join mobility programs and to study several semesters at different European universities, which are strongly recommended to students by academic staff.

2.6. Program management

The program is managed by the head of Department of Biomechanics, who is appears to be a highly motivated academic staff member in Associate Professor (docent) status. The program is carried by three additional members of Department mainly (see Subsection 2.3), who are assisted by 4 PhD students recently.

The attractiveness of this program is constant; the number of enrolled students has been around 30 in the last 5 years (Table 14 within the SER). The study program provides a solid education in engineering sciences. Increasing study quality, internationalization, and lifelong learning activities have been supported by an EU funded program.

The internal quality management and evaluation processes are clearly defined; students are involved in procedures. The data and information on implementation and outcomes of the program are regularly collected, analysed by academic staff and by students too. The Faculty should keep continuously on encouraging the students to participate actively in surveys.

The Faculty spent a lot of effort into modernization and development of the study program and the facilities in considering the recommendations of the previous external international evaluation. Pre-Bologna structures, as experienced from the review team from other visits, appear to be removed from this program. This is highly appreciated and indicates a tendency for the alignment of the Lithuanian higher educational system to the Bologna System. The Faculty is studying continuously the study plan in comparison with curricula of different European universities and the most important key points are built in own curriculum. The Faculty may

consider expanding continuously this approach. It also may be recommended that the Faculty gives consideration to ways in which the contribution of employers and graduates developing the programme could be formalised and strengthened to a greater extent in the future.

The review team has been impressed by the professionalism of the organization and management of this program. The management is working on continuous development of the program. The review team experienced from its recent visit that great improvements have been achieved in this program since the last accreditation. As one of the current reviewers has already been employed in the previous evaluation of this program, and two of the academic reviewers are experienced with the Lithuanian higher education system from prior visits, an excellent improvement is observable in this program. Despite the reviewer's impression that often "pre-Bologna"-structures are still present in study programs in some eastern European regions, the responsibility for this program has been handed over to a quite young team of academics with quite high potential.

In addition, a huge potential is seen with regard to the impact of this specific program on biomechanical engineering, both on the development of an internationally recognized centre in this field of engineering science and consequently on the development of industries in the Baltic region.

Strengths: of the program management are summarized as follows. The program is a well-organized and it is close to the study programs of different European universities and to Bologna structures. The student and staff exchange program is practiced properly. The development of study program is continuously, which is organized by the head of the department.

III. RECOMMENDATIONS

1. The review team recommend the change of the name of the study program *Biomechanics*, because it is too narrow to describe the broadness of educational aims, study plan and subjects. The review team recommends the title *Biomechanical Engineering*, which will better reflect the actual content of the study program (the program is based on a mechanical engineering program background with biological and medical aspects) and is expressed quite well by the title of the degree provided: *Bachelor of Biomechanical Engineering*.
2. It is recommended to provide classes of specific subjects on biomedical engineering earlier in the study program. Thus the motivation of students could be enhanced.
3. One of the most important tasks is to increase the number of young full professors.
4. It is recommended to support of teachers for developing scientific excellence by providing resources and freedom for their own original research in order to increase the international visibility of scientists, for example to support the attendance at world leading international conferences.
5. Further increase of the number of academic staff is recommended, because it could decrease teaching loads, which would help increase scientific research activities.

IV. SUMMARY

Vilnius Gediminas Technical University offers a modern first level university study program on *Biomechanics*, which has been developed quite much since the past evaluation. The program aims and learning outcomes were prepared in accordance with national legal requirements and with European standards. The name of the study program *Biomechanics* is relatively narrow comparing to the broader educational aims, intended in outcomes, study plan and subjects.

The strength of the 8-semester study plan is the clear curriculum design for this interdisciplinary field of studies, which is consistent and well-structured. The increase of focus on scientific research could strengthen the learning outcomes.

Young staff members are very motivated for teaching. The student to teacher ratio is very good compared to European universities. Academic staff members are less visible on international scene.

Technical equipment for lectures halls are on the state of the art level. The library is well equipped with related textbooks and with specific scientific journals (e-journals). In the last few years the equipment of laboratories has been renewed.

The timetable of semesters, organization of the program, the program aims and learning outcomes appear to be very well designed. The course cards are well organized and sketch widely the most important dates.

The management of the program is very engaged and very efficient management structures have been implemented by the young and motivated team.

V. GENERAL ASSESSMENT

The study program *Biomechanics* (state code – 612H15002) at Vilnius Gediminas Technical University is given **positive** evaluation.

Study program assessment in points by evaluation areas.

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

Grupės vadovas:

Team leader:

Prof. dr. Udo Nackenhorst

Grupės nariai:

Team members:

Prof. dr. Rita Mária Kiss

Prof. dr. Māris Kļaviņš

Mr. Tomas Sinevičius

Mr. Gabrielius Jakutis

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO PIRMOSIOS PAKOPOS
STUDIJŲ PROGRAMOS *BIOMECHANIKA* (VALSTYBINIS KODAS – 612H15002)
2016-06-21 EKSPERTINIO VERTINIMO IŠVADŲ
NR. SV4-145 IŠRAŠAS**

<...>

VI. APIBENDRINAMASIS ĮVERTINIMAS

Vilniaus Gedimino technikos universiteto studijų programa *Biomechanika* (valstybinis kodas – 612H15002) vertinama **teigiamai**.

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

<...>

V. SANTRAUKA

Vilniaus Gedimino technikos universitetas vykdo šiuolaikinę pirmosios pakopos universitetinę *Biomechanikos* studijų programą, kuri po paskutinio vertinimo buvo ganėtinai patobulinta. Studijų programos tikslai ir numatomi studijų rezultatai parengti laikantis nacionalinių teisės aktų ir europinių standartų. *Biomechanikos* studijų programos pavadinimas yra sąlyginai siauras, palyginti su platesniais ugdymo tikslais, numatomais studijų rezultatais, studijų planu ir dalykais.

8 semestrų studijų plano stiprybė yra aiški šios tarpdalykinės studijų krypties programos sandara, kuri yra nuosekli ir gerai organizuota. Didesnė orientacija į mokslinius tyrimus galėtų sustiprinti studijų rezultatus.

Jauni darbuotojai labai motyvuoti dėstyti. Studentų ir dėstytojų santykis labai geras, palyginti su Europos universitetais. Tačiau dėstytojai mažiau pastebimi tarptautinėje arenoje.

Auditorijose esanti techninė įranga yra moderni. Biblioteka gerai aprūpinta su studijomis susijusiais vadovėliais ir specializuotais moksliniais žurnalais (el. žurnalais). Per paskutinius keletą metų laboratorijų įranga buvo atnaujinta.

Semestrų tvarkaraštis, programos organizavimas, programos tikslai ir numatomi studijų rezultatai puikiai parengti. Dalykų aprašai puikiai organizuoti ir juose nurodytos visos svarbiausios datos.

Programos vadovybė labai įsitraukusi, o jaunas ir motyvuotas personalas diegia itin veiksmingas valdymo struktūras.

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III. REKOMENDACIJOS

1. Ekspertų grupė rekomenduoja pakeisti *Biomechanikos* studijų programos pavadinimą, nes jis pernelyg siauras, kad apimtų plačius švietimo tikslus, studijų planą ir dalykus. Ekspertų grupė siūlo *Biomechanikos inžinerijos* pavadinimą, nes jis geriau atspindėtų tikrąjį studijų programos turinį (programos pagrindas – mechanikos inžinerija su biologijos ir medicinos aspektais) ir jį puikiai išreiškia suteikiamo laipsnio pavadinimas: *Biomechanikos inžinerijos bakalauras*.
2. Rekomenduojama anksčiau studijų programoje dėstyti specialiuosius biomedicinos inžinerijos dalykus. Taip būtų keliama studentų motyvacija.
3. Viena iš svarbiausių užduočių yra didinti jaunų etatinių profesoriaus vardą turinčių dėstytojų skaičių.
4. Rekomenduojama remti dėstytojų mokslinės kompetencijos tobulinimą suteikiant jiems išteklių ir laisvės vykdyti asmeninius originalius tyrimus, siekiant didinti tarptautinį mokslininkų matomumą, pavyzdžiui, remti jų dalyvavimą svarbiausiose tarptautinėse konferencijose.
5. Rekomenduojama ir toliau didinti dėstytojų skaičių, nes tai padėtų sumažinti darbo krūvį ir padidintų laiką, skiriamą mokslinei tiriamajai veiklai.

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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)