



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO  
STATYBOS MEDŽIAGOS IR DIRBINIAI STUDIJŲ  
PROGRAMOS (621J82001)  
VERTINIMO IŠVADOS**

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**EVALUATION REPORT  
OF CONSTRUCTION MATERIALS AND PRODUCTS  
(STATE CODE 621J82001) STUDY PROGRAMME  
at VILNIUS GEDIMINAS TECHNICAL UNIVERSITY**

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Išvados parengtos anglų kalba  
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## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Statybos medžiagos ir dirbiniai</i>
Valstybinis kodas	621J82001
Studijų sritis	Technologijų mokslai
Studijų kryptis	Statybų technologijos
Studijų programos rūšis	Universitetinės
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinės (2)
Studijų programos apimtis kreditais	120
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Statybų technologijų magistras
Studijų programos įregistravimo data	2001-08-02

## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Construction Materials and Products</i>
State code	621J82001
Study area	Technological Sciences
Study field	Building Technologies
Kind of the study programme	University studies
Study Cycle	Second cycle
Study mode (length in years)	Full-time studies (2)
Volume of the study programme in credits	120
Degree and (or) professional qualifications awarded	Master of Construction Technologies
Date of registration of the study programme	2001-08-02

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## I. INTRODUCTION

Vilnius Gediminas Technical University (VGTU) is a state higher academic school which has the rights of legal entity, acts as a public institution and one of the largest higher education schools in Lithuania. VGTU is the second university in Lithuania according to the number of “study baskets” granted and the only technical university among the Baltic states in the QS World University Rankings 2012/2013.

Studies and research are managed at the University by 10 faculties, including 10 research institutes, 19 research laboratories, 5 research centers that carry out academic activities. The academic staff includes 930 persons. Number of students varies year by year with an average 13.000 value. 100 study programmes are based on three-cycle structure: undergraduate, graduate and post-graduate studies.

The mission of the University is to educate socially responsible, creative, competitive personality, receptive to science and latest technologies as well as cultural values.

The University aims are:

- to offer studies and provide modern university education and qualifications of higher education;

- to develop of scientific knowledge in various fields, high-level scientific research;

- to develop society receptive to education, science, art and culture through effective use of science and competition in the market of high technology products and services.

The study programme of Master of Construction Technologies *Construction Materials and Products* is managed by the Department of Building Materials of the Faculty of Civil Engineering in VGTU, but other departments from Fundamental Sciences and Civil Engineering Faculties participate in the study programme realisation as well.

The evaluation of the programme *Construction Materials and Products* of the main studies was performed by the Study Quality Evaluation Centre in 2003. The special education unit consists of studies about building materials according to different approaches and criteria, and their production technologies, therefore the material in these modules can be repeated. A new programme *Construction Materials and Products* start to be realized in 2011. Previous programme of studies under the same name has been taught since 1990.

## II. PROGRAMME ANALYSIS

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

The programme aims are well defined, clear and publicly accessible. They can be found in the home page of university.

Main programme aims described in Self-Assessment Report are education of highly qualified specialists with:

knowledge of construction technologies, building materials production technologies and items;

with ability to design and optimise new and modern technological processes;

orientation to create new and apply existing building materials technologies and methods;

skill to develop new knowledge and integrate existing different knowledge from other fields.

Programme aims mostly stressed on to technological processes, technologies of building materials production. That is why it can be misunderstanding with programme's name Construction Materials and Products and its learning outcomes. But all the interested parts (University's administrations staff, programme managing staff, students and stakeholders) express their opinion that the name of the programme does not mismatch its name and learning outcomes. Name of programme corresponds and is compatible with predicted or desirable outcomes of programme. As stated in the programme's homepage: graduates can work in building materials and products technology design and various manufacturing plants, construction materials testing and quality control laboratories, research and academic institutions.

Demand of specialist in the labour market programme is based on the labour market expectations and demands. About 70% of graduates were employed according to their specialty since 2007 year. The needs for this programme specialist are confirmed and specified by official and private institutions and entities. Taking in mind that average value of employment level is provided for last 5 years and includes period of economic recession and recovery in the construction sector's labour market. It shows that the programme aims and learning outcomes are based on public needs and the needs of the labour market. The need of the specialists of programme is proved by the study of construction sector, performed in 2008. It states that the number Master degree specialists prepared by higher educational institutions satisfies so far, about 60-65% of the need of construction sector.

### *2. Curriculum design*

Scope of the studies, subjects including theoretical, practical studies, course and laboratory works, and final thesis, students' independent and auditoria work meets legal acts' requirements.

Total sum of is 120 ECTS credits of full-time study programme. The studies continue 2 year and studies (one year studies is 60 credits or 30 credits per semester) are finished by the defending of a final thesis (30 ECTS credits). Each study year has two semesters of autumn and spring. Each semester consists of 20 weeks (1-3 semesters consist of 15 lectures' weeks, 1 week of independent work and 4 session's weeks; 4<sup>th</sup> semester consists of 20 weeks for Final Thesis preparation). The number of obligatory study subjects in 1-3 semesters is 5 and does not exceed

legal requirements and includes not more than 5 session's exams. There are 4 obligated studies in 1-2 semester and one option that can be selected from 3 alternatives.

Some of elective subjects have not been chosen by the students for 5 or more years (Risk-Based Design, Quality Management Systems, Structures of Forms and Shuttering, Materials of Modified Structures). These subjects teaching lecturers argued this state because of students' choice to learn more easy subjects, willingness not to select more complicated ones. Students mentioned that in their department it is common to choose elective module more related to their subject of studies and department's staff asks to select one or another subject. Department's staff explain situation with non-popular elective subjects in the way that University's rules obligate to provide corresponding number of subjects that students can chose to make their study process more flexible and applied to their needs. Experts' opinion is that the existence of non-popular subjects does not provide necessary flexibility of study process. Students do not want to select these subjects (for various reasons) and cannot choose another subject because of its absence in study program.

The programme includes 6 course works that are part of the learning subject. Not more than 2 works per semester are planned. The last semester continues 13 weeks and organised for students to prepare, register and defend final thesis which is also prepared and controlled by the department during 1-3 semesters. The total number of auditoria and laboratory hours teaching is 3200 and 405 of them are planned for lectures; 44 hours for laboratory works. This also meets the legal requirements of minimal contact training duration.

Study subjects are spread enough and their themes and contents are not repetitive and consistent with the type and level of the studies.

The content of the programme reflects the latest achievements in science and technologies. The programme's main aims are to provide ability to design and optimise, create new and apply existing materials. According to the teaching staff a lot of attention is stressed to utilisation of industry wastes through their usage in new materials, products, their production and technology process. This stressing can be found in the subjects and names of Final Theses, in the programme running department's staff research work.

Although laboratory works meets legal acts and their requirements by the number of hours to ensure learning outcomes expected by programme's organising institution and employing organisation. But there are lack of laboratory works in main programme subjects (as example: Structure of Aluminosilicate Materials and Their Properties, Polymeric Building Materials and Products) directly related with the programme aims and learning outcomes. Students and lecturers prefer to extend number of subjects with laboratory works. It was mentioned by the staff that Aluminosilicate Materials and Their Properties subject included laboratory works but after last revision of study programme laboratory works were eliminated. Students mentioned that would like also to know and to observe how testing methods that are described in Testing Methods of Building Materials subject can be performed and/or applied in practice.

There is a lack of methodological resources for main subjects. Even the only study that implements laboratory activities has not methodological literature for these works.

Alumni and other stakeholders expressed their wishes to make laboratory works more related to the production or building site, to be more practically applicable (ex. defectology). They mentioned that part of the information that students get not related with business requirements and they would like to propose programme managing staff introduce in the programme enterprise management subject.

### **3. Staff**

Generally the study programme and teaching staff are provided by the staff meeting legal requirements and exceed expectations.

As stated in Summary of Self-Assessment 14 (5 Prof. dr., 9 Assoc. prof. dr.) (in The List of Teachers says that there are 14 persons involved in the programme, but Summary's Self-Assessment table 2 states that total number of staff is 16: 5 professors, 10 associated professors and 1 assistant teach in the programme). Programme's lecturers participating in the programme *Construction Materials and Products* are average 23 year pedagogical experience and are quite active in with methodological and scientific publications and improve their qualification and knowledge during study visits, performing and implementing ordered works and international projects, participating in various activities. It is shows that teaching staff can develop their professional skills necessary for the provision of programme.

The qualifications of the teaching staff are adequate to ensure learning outcomes.

Almost all of lecturers are full-time employed with average age 48 year with. More than 80% are from 40 to 60 years old.

Programme's lecturers Full-text articles, conference reports, books, statistics and bibliographic documents can be found in Electronic databases. Although teaching staff turnover is able to ensure an adequate provision of the programme and fulfill all legal requirements to occupy their positions, but the amount of academic and research activities publishing their research and academic works in leading international and local journals, participating in conferences and symposiums could be improved in future. University took 10th place in Europe and the 1st place in Lithuania by teachers leaving to read lectures between teachers participating in ERASMUS higher education institutions, but it is not clear how many programme's lecturers, how often and for how long have been involved in ERASMUS programme last few year.

The programme's teaching staff is involved in research work directly related to the study programme by supervising of Final Thesis, performing of ordered researches, researching and developing of waste appliance for utilisation with new developed materials and products by improving their physical and mechanical properties, publishing their results in articles and presenting in conferences, seminars and symposiums.

The technical staff in laboratories (in university and also in Thermal Insulation institute) are well qualified to service technical equipment and participates in the study process with helping to manage equipments during test, investigation or other students' research work.

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

There are sufficient auditoria rooms for streaming lectures, exercises and laboratories for laboratory work. The number of master students in the class is no more than 15, and therefore the number of installed workplaces in the laboratories is sufficient and there is no need to divide the academic group into subgroups.

Master students can perform research for their master thesis in the laboratories at the agreed time. Individual tasks students can perform in the reading room of the library which is opened

from 9 till 21 (depends on the purpose of service). For individual and independent tasks students can use the University's or library's specialised room where all of computers equipped with standard software packages. Library also provides printing, scanning and binding services. Students have a possibility to work with specific software such as STAAD Pro, AutoDesk's and Bentley's products, Sistela, MathLab etc. as that they need for their studies and final works. Besides common workplaces student have workplaces in department and laboratory. University has wireless internet access and in fixed locations can be reachable for the students.

University has access to 23 prescribed databases such as Cambridge Journals Online, EBSCO, Emerald eJournals Collection, IOP Publishing, Oxford University Reference and Press Journals, Springer LINK, Taylor & Francis that allows access to sources where students can find specific literature that they need in their studies.

Teaching materials as textbooks, books, periodical publications, databases are in most cases accessible. Some of the additional and especially of main literature sources stated in the descriptions of study subjects cannot be found in methodological rooms of the faculty and the department either in University's library or other state's libraries (as example in Theory and Methods of Optimization in Technics, Materials and Items for Modernization of Buildings studies subjects descriptions). It is necessity to have at least one copy of these books in University's library or to make electronic copy with all copyrights and place in University's server with free access for students, or to replace books with other adequate sources that can be easily accessed.

Laboratory works and final works of master study programme are performed in University's laboratory and laboratories of the Institute of Thermal Insulation where students can conduct experiments related with research and development of mortars, binding and insulation materials, investigate building structures for their energy efficiency. Laboratories are equipped with the necessary equipment and materials needed, taking into account the number of students. Although annually new laboratory equipment is purchased, the latest and most modern equipment is difficult to obtain. The main obstacle is limited financial capacity of University.

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

The admission requirements are public and well founded and can be found in University's homepage and described in Summary of Self-Assessment and it is quite clear what kind of education you need beforehand to enrol into this study programme. The admission system is understandable for students. It was said during the on site visit.

The organization of the study is really good. Students understand their learning outcomes and their study programme aims. Supervision of the master thesis is excellent, because they have at least two staff members that help them in their work. The aim of the study programme is understandable for students. They get good information on what they are going to study and what kind of job opportunities they are going to have.

Students are encouraged to participate in different activities. They are taken into different commercial institutions and production sites where they can practically see their field applications. Students expressed opinion that they would like and need more practical visits to industry like ones described above. Also they felt a need for more practical activities in their subjects. University has different student organisations that encourage students to participate in their work. The department has a lot of equipment that students can use in their final thesis.

Students have opportunities to participate in student mobility programmes. Participation level in these programmes (mostly in ERASMUS) of the Building Materials Department is one of the largest in University, but mostly during first level studies (Bachelor degree). They mentioned that due to their employment they could not go study abroad.

An assessment system of student's performance is clear since relations of assessment criteria with the planned study outcomes are common throughout the study programme. The Programme includes the following accounting types: exam, course project, course work, and thesis. Studies' results of the assessment criteria and procedures are published in University's website, also in Web site created in 2009 for students „Mano.vgtu“.

The lecturers are involved in quality assessment and improvement. Programme's managing department checks students' attendance, self-study course tasks and preparation of draft analysis and involved in curriculum evaluation of the quality assessment of the lecturers and develops, modifies new and existing programmes to meet the expectations of all participants in the programme.

Programme's studies teachers and final thesis supervisors constantly and continually provide assistance and consult students, who have consultation opportunities during duty hours and prepared consultation schedule, by phone or e-mail.

University ensures an adequate level of academic and social support. All interested persons may obtain information about all programmes. The most important information related to studies is provided on the University's website. Information is also available on department notice boards and displays. The students of the programme can participate in various sport, art activities and other University social life.

There is no information about students' accommodations, canteens, provided living services by University, their price level etc.

Statistic of graduates' employment level shows that main part graduates employed according their specialty and their professional activities meets the programme providers' expectations as main expectation is to educate highly qualified competitive specialists. Students also have possibility to work part or full time because of the flexible studies' schedule according their needs.

## ***6. Programme management***

The main University's internal structures to ensure the quality at university level are the Senate and Rector and in the faculty level - the Faculty Board and the Dean. Programmes managing departments also participate in development, improvement and updating of master degree programmes or their specialisations in the programme.

Main stakeholders are the building industry companies represented by Building Industry Association, employers' representatives and a faculty study committee. During the meetings is discussing students' practical training with a focus on graduating student's study and practical skills. Stakeholders have possibility and participate in education by providing lectures about novelties in their business, advice theme of the final work concentrated more on the practical application of specific practical problems, make specific proposals to improve the content of the studies.

Programme managing department carry out SMD Alumni Club (Alumni) activities and its members participate in improving of training, workshops and subjects programmes, offer actual topics and problems for final theses.

It was mentioned by stakeholders that they would like to have discussion about possibility to revise programme's content of subjects and as example to provide for Fundamentals of Research an Innovation, Theory of Methods of Optimisation in Techniques subjects elective status, to make subject Quality Management Systems compulsory for students and implement quality principles in programme's all main subjects.

Stakeholders were involved the preparation of Self Assessment Report but nobody from them participates in the study programme quality committee.

Students can and participate in quality assurance and improvement through Student Representation Office in Faculty Council members and influence deep academic and social problems, implement them by various methods that improve the studies' quality. But they do not have their representative from Master studies in the Student Representation Office.

An automated survey system is installed in the University which aim is give the assess students' opinions or views on issues, the quality of teaching, the subject of practical use. Summary of these opinions can improve curriculum, programme and teaching subjects. But students do not feel that estimation of subjects and lecturers, and their opinion is taking into account by the department and teaching staff (as example: students for several previous years asked department's staff to change lecturer of Computer Aid Design subject because of his "not pedagogical behavior with students during the lectures", but noting have been changed for several years).

Students have also opportunity to explain their opinion and expectations and propose, suggest ways of improving the quality of higher education in periodical meetings organized by a deans and student groups.

On the other hand, the quality assurance needs improvement. No current student (from master's level) is involved in the study programme committee. And the automatic survey system about the study quality and students view is not taken into the account from the department (that was the general view of the students).

The lecturers also involved in higher education quality assessment and improvement. Lecturers meet with students during lectures and after them during duty time and discuss education quality and student problems. In the periodical department meetings staff is discussing educational issues, programme's and study subjects' improvement proposals, marketing issues. Department staff is also involved in evaluation of their colleagues' quality assessment, discussing shortcomings and develop new programmes to rectify, modify existing programmes to meet programme's participants' expectations.

The programme coordinators have close and systematic cooperation with other departments to realise and help implement a programme of study. The lecturers are responsible for their studies' quality personally but the main responsibility for the quality of the programme lies with the programme managing group.

The programme managing department constantly takes care of the teaching quality, and renewal of modules and study programme. All lecturers of the department participate in the process of the programme renewal.

University's academic programmes and quality assurance process described in the various levels of documentation: University's vision, mission, values and objectives of education and training in quality management system model description; common university procedures, department policy; quality and description of procedures books of sub-divisions, accredited laboratories; description of studies' programmes. Implementation of quality standards ensured through internal quality audits.

Programme's information, such as:

achievements and other students data, final works topics, teachers mobility statistics, data on educational laboratories and equipment, practices, databases, recommendations of social members, stakeholders, observations of students and graduates in the survey responses, is systematically collected and analysed to ensure and improve programme's quality. The internal quality assurance measures are effective and efficient.

### III. RECOMMENDATIONS

1. To revise list of elective subject and to eliminate non-popular such as Risk-Based Design, Structures of Forms and Shutterings.
2. To introduce new subject or subjects related with enterprise's management and other subject closely related to the programme name and aims.
3. To make subject Quality Management Systems compulsory for students, as it is directly and close related with students outcomes and stakeholders expectations. And ensure that quality principles would be implemented in all main subject related to the programme's name, aims', learning outcomes', students' and stakeholders' expectations.
4. To organise laboratory works in these subjects:
  - Structure of Aliumosilicate Materials and Their Properties,
  - Polymeric Building Materials and Products. as they closely related with the main aims, learning outcomes and employers' expectations.
5. To provide possibility for students to improve their practical knowledge during lectures of Testing Methods of Building Materials with laboratory works and/or visual observation and/or practical appliance in production/building sites.
6. To analyse and discuss with students and stakeholders about necessity to have compulsory subjects Fundamentals of Research an Innovation, Theory of Methods of Optimisation in Technics in the programme content and opportunity to make them elective.
7. To provide possibility for students to choose subject without straight recommendations from teaching and department's staff.
8. To stress more attention to practical appliance of knowledge, organisation of internships, orientation and relation of laboratory works to field/site/industrial applications. Students opinion and evaluation of subjects' and lecturers' must be constantly revised and taken into account with obligated meeting with students, teachings and programme managing staffs.
9. Study modules need to be reviewed to ensure that use newest foreign and/or local bibliography in organisation of each study. All literature sources that are used in bibliography should be not older than 15 years and department managing the programme need to have at least one copy of each in methodological room. Literature that cannot be found in methodological room, University library should be eliminated from study's bibliography.
10. Lecturers' and students' mobility programmes need to be organised more attractive and compatible with the main part or full time work. Programme's managing department needs variously support and develop exchange programme.

11. Process of the study programme and the whole process of the studies could be managed more flexible, constantly improving programme by introducing of subjects that deals with novel materials, technologies and techniques to meet study regulations prestigious European universities programmes. Constant dialog with stakeholders could ensure proper outcomes and meet market and employers' expectations and demands.

#### IV. SUMMARY

The title – name of the programme corresponds to curriculum, programme aims and learning outcomes majority of which are related to production and technology that match the type and level of studies and it was also confirmed by students and stakeholders. All parts (stakeholders, alumni, student and teaching staff) are convinced that programme is based on professional requirements, public and labour market needs. Experts' opinion is that Curriculum design meets legal requirements and the scope of the programme is sufficient to ensure learning outcomes. Research outcomes as publications and performed works show that programmes' teaching staff well involved in the research work which is directly related to the programme and is able to ensure stakeholders', students' expectations and industry needs. Their experience and qualification meet well the programme aims and is enough to ensure learning outcomes. Laboratories where students can make their research works are very well equipped and their testing, measuring, calculation and other equipments and tools corresponds requirements of modern laboratory.

Commonly students satisfied with flexible studies' schedule, their benefits from visits to manufactures, production sites and content of the programme. Alumni and employers satisfied with theoretical knowledge of graduates but they would prefer to be more involved in programme management and quality assurance and to make the programme more related to practical issues. There is the need for all parts (students, stakeholders, alumni, programme teaching and managing staffs) to have brief discussion with programme managing staff about necessity to move few subjects from selective to compulsory, some from compulsory to elective and some elective subjects need to be updated or changed by more attractive and related to the name, aims and learning outcomes of programme to correspond students' and stakeholders' expectations and needs. Stakeholders, students and teaching staff prefer to extend number of subject with laboratory works directly related with the programme aims and learning outcomes.

## V. GENERAL ASSESSMENT

The study programme *Construction Materials and Products* (state code – 621J82001) 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	4
4.	Material resources	4
5.	Study process and assessment (student admission, study process student support, achievement assessment)	4
6.	Programme management (programme administration, internal quality assurance)	3
	<b>Total:</b>	<b>22</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.

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<...>

## V. APIBENDRINAMASIS ĮVERTINIMAS

Vilniaus Gedimino technikos universiteto studijų programa *Statybos medžiagos ir dirbiniai* (valstybinis kodas – 621J82001) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	4
2.	Programos sandara	3
3.	Personalas	4
4.	Materialieji ištekliai	4
5.	Studijų eiga ir jos vertinimas	4
6.	Programos vadyba	3
	<b>Iš viso:</b>	<b>22</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

Programos pavadinimas atitinka jos turinį, tikslus ir studijų rezultatus, kurių dauguma yra susiję su gamyba ir technologijomis, atitinkančiomis studijų tipą ir lygį – tai patvirtino studentai ir socialiniai partneriai. Visos šalys (socialiniai partneriai, absolventai, studentai ir dėstytojai) yra įsitikinę, kad programa pagrįsta profesiniais reikalavimais, visuomenės ir darbo rinkos poreikiais. Ekspertų nuomone, programos sandara atitinka teisinius reikalavimus, o jos tikslas yra pakankamas studijų rezultatams užtikrinti. Publikuojami tyrimų rezultatai ir atlikti darbai rodo, kad programos dėstytojai yra labai įsitraukę į tiesiogiai susijusių tiriamąją veiklą, todėl gali patenkinti socialinių partnerių, studentų lūkesčius ir pramonės reikmes. Jų patirtis ir kvalifikacija puikiai dera su programos tikslais, jų pakanka studijų rezultatams užtikrinti. Laboratorijos, kuriose studentai gali atlikti tiriamuosius darbus, yra labai gerai įrengtos, o bandymų, matavimų bei skaičiavimų įranga atitinka šiuolaikinių laboratorijų reikalavimus.

Studentai paprastai yra patenkinti lanksčiu studijų tvarkaraščiu, išvykų į fabrikus ir gamybos vietas nauda, programos turiniu. Absolventai ir darbdaviai patenkinti baigusiuju

teorinėmis žiniomis, bet pageidautų būti labiau įtraukti į programos vadybą ir kokybės užtikrinimą, kad programa būtų dar labiau susieta su praktiniais klausimais. Visos šalys (studentai, socialiniai partneriai, absolventai, programos dėstytojai ir vadybos personalas) išreiškė norą su programos vadybos personalu trumpai aptarti būtinybę perkelti kelis dalykus iš pasirenkamųjų į privalomuosius, kitus – iš privalomųjų į pasirenkamuosius, o kai kuriuos pasirenkamuosius dalykus atnaujinti arba pakeisti patrauklesniais, vadovaujantis programos pavadinimu, tikslais ir studijų rezultatais, kurie turėtų labiau atitikti studentų ir socialinių partnerių lūkesčius ir poreikius. Socialiniai partneriai, studentai dėstytojai pageidauja didesnio dalykų skaičiaus su laboratoriniais darbais, kurie būtų tiesiogiai susiję su programos tikslais ir studijų rezultatais.

### III. REKOMENDACIJOS

1. Reikia peržiūrėti pasirenkamųjų dalykų sąrašą ir panaikinti tokius nepopuliarius dalykus kaip „Rizikos įvertinimu grįstas dizainas“, „Formų ir klojinių struktūros“.
2. Reikia įtraukti naujų dalykų, susijusių su įmonių valdymu, ir kitų dalykų, glaudžiai susijusių su programos pavadinimu ir tikslais.
3. Dalykas „Kokybės vadybos sistemos“ turi būti privalomas visiems studentams, nes jis yra tiesiogiai ir glaudžiai susijęs su studentų rezultatais ir socialinių partnerių lūkesčiais. Būtina užtikrinti, kad kokybės principai būtų įgyvendinami visuose pagrindiniuose dalykuose, susijusiuose su programos pavadinimu, tikslais, studijų rezultatais, studentų ir socialinių partnerių lūkesčiais.
4. Reikia organizuoti šių dalykų laboratorinius darbus:
  - „Aliuminio silikatų struktūros medžiagos ir jų savybės“;
  - „Polimerinės statybinės medžiagos ir produktai“.Šie dalykai yra glaudžiai susiję su pagrindiniais tikslais, studijų rezultatais ir darbdavių lūkesčiais.
5. Reikia suteikti studentams galimybę patobulinti praktines žinias dalyko „Statybinių medžiagų bandymo metodai“ paskaitose su laboratoriniais darbais, vaizdo stebėjimais arba praktiniu pritaikymu gamybos ir statybos vietose.
6. Reikia išanalizuoti ir su studentais bei socialiniais partneriais aptarti būtinybę įtraukti tokius privalomuosius dalykus kaip „Tyrimų ir inovacijų pagrindai“ bei „Optimizacijos technikoje metodų teorija“ į programos turinį ir galimybę padaryti juos pasirenkamaisiais.
7. Reikia suteikti studentams galimybę pasirinkti dalykus be tiesioginių dėstytojų ir katedros darbuotojų rekomendacijų.
8. Reikia daugiau dėmesio skirti praktiniam žinių pritaikymui, stipendijų organizavimui, orientavimui ir laboratorinių darbų ryšiui su srities, gamybos ar statybos vietų, pramoniniu pritaikymu. Studentų nuomonė ir dalykų bei lektorių įvertinimas privalo būti nuolat peržiūrimas, į jį būtina atsižvelgti studentų, dėstytojų ir programos vadybos personalo susitikimuose.
9. Reikia peržiūrėti studijų modulius ir užtikrinti, kad organizuojant kiekvieną kursą bus naudojama naujausia užsienio ir (arba) vietinė bibliografija. Visi bibliografijoje naudojami literatūros šaltiniai neturėtų būti senesni nei 15 metų, o programą kuruojanti katedra turi turėti bent vieną jų kopiją metodologiniame kabinete. Literatūra, kurios negalima rasti universiteto bibliotekoje turėtų būti panaikinta iš studijų bibliografijos.
10. Lektorių ir studentų mobilumo programos turėtų būti organizuojamos patraukliau ir labiau suderinta su darbu pilnu etatu. Programą kuruojanti katedra turi teikti įvairiapusę paramą ir tobulinti mainų programas.

11. Studijų programos eiga ir visa studijų eiga galėtų būti lankstesnė, reikia nuolat tobulinti programas ir įtraukti dalykus, kuriuose nagrinėjamos naujoviškos medžiagos, technologijos ir technikos; taip bus patenkinti prestižinių Europos universitetų programų studijų reikalavimai. Nuolatinis dialogas su socialiniais partneriais galėtų užtikrinti tinkamus rezultatus ir patenkinti rinkos bei darbdavių lūkesčius ir reikalavimus.