



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus Gedimino technikos universiteto  
**STUDIJŲ PROGRAMOS *INOVATYVI KELIŲ IR TILTŲ*  
*INŽINERIJA (valstybinis kodas – 628H20001)*  
VERTINIMO IŠVADOS**

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**EVALUATION REPORT of  
*INNOVATIVE ROAD AND BRIDGE ENGINEERING*  
*STUDY PROGRAMME (state code – 628H20001)*  
at Vilnius Gediminas technical university**

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Išvados parengtos anglų kalba  
Report language – English

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Inovatyvi kelių ir tiltų inžinerija</i>
Valstybinis kodas	628H20001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Statybos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinė (1,5)
Studijų programos apimtis kreditais	90
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Statybos inžinerijos magistras
Studijų programos įregistravimo data	2014/02/01

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## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Innovative Road and Bridge Engineering</i>
State code	628H20001
Study area	Technological Sciences
Study field	Civil Engineering
Type of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full-time (1,5)
Volume of the study programme in credits	90
Degree and (or) professional qualifications awarded	Master of Civil Engineering
Date of registration of the study programme	02/01/2014

Studijų kokybės vertinimo centras

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## I. INTRODUCTION

### 1.1. Background of the evaluation process

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

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

The evaluation process consists of the main following stages: 1) *self-evaluation and self-evaluation report prepared by Higher Education Institution (hereafter – HEI); Self-assessment report (State code 628H2000); 2) visit of the review team at the higher education institution between 27.11. and 3.12.2016; 3) production of the evaluation report by the review team and its publication; 4) follow-up activities.*

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

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

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

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

### 1.2. General

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

No.	Name of the document
1.	Study programme committee minutes No 7 of 2016-09-06

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

**Vilnius Gediminas Technical University (VGTU)** is a state institution of higher education. VGTU is one of the largest institutions of higher education in Lithuania and strives to become the leader in technology and engineering studies in the Baltic States. According to the Self-evaluation

report, VGTU aims to educate highly trained, creative and socially active professionals, who would be able to successfully enter the Lithuanian and foreign labour and research markets; carry out research at the highest competence research divisions; attract well-known scientists, create innovations for society and business based on research; and become the leader among the Baltic States universities in the field of sustainable engineering, transport, sustainable environment, information technologies and communication science; promote cohesive development of the country and region; and develop the innovative society.”

The MSc degree joint study programme *Innovative Road and Bridge Engineering* managed by VGTU together with Riga Technical University (RTU), which started on 1st September 2015 (study year 2015/2016). The programme is classified as a university programme in the study area “Technology Sciences”, study field “Civil Engineering” (H200). As an international joint study programme involving the faculties from two different countries speaking different languages the programme is performed in English only. Awarded Degree and (or) Professional Qualification is “Master of Civil Engineering”.

Students start to study in VGTU in the first semester. The second semester is performed at RTU in Riga. The third semester is divided between the two institutions involved and is intended for the preparation of the master thesis. The students may decide what institution to choose for the preparation of the master thesis.

#### **1.4. The Review Team**

The review team was completed according *Description of experts’ recruitment*, approved by order No. 1-01-151 of Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on 30<sup>th</sup> November 2016.

1. **Prof. dr. Haldor Jochim (team leader)**, *Professor of Railway and Transport Planning, FH Aachen University of Applied Sciences, Germany.*
2. **Prof dr. Miroslav Premrov**, *Dean of the Faculty of Civil Engineering, Transportation Engineering and Architecture, University of Maribor, Slovenia.*
3. **Assoc. Prof. dr. Tone Merete Muthanna**, *Associate Professor of Hydraulic and Environmental Engineering Dep., Norwegian University of Science and Technology, Trondheim, Norway.*
4. **Assoc. Prof. dr. Jelke Dijkstra**, *Associate Professor of Civil and Environmental Engineering Dep., Chalmers University of Technology, Sweden.*
5. **Dr. Dalė Daunoravičiūtė**, *Quality Manager at the public institution “Technical supervision services”, Independent Consultant, Lithuania.*
6. **Ignas Gaiziūnas**, *Bachelor student in Energy Physics, Vilnius University, Lithuania.*

## II. PROGRAMME ANALYSIS

### 2.1. Programme aims and learning outcomes

According to the traditional cooperation between VGTU and RTU, both institutions decided to prepare a joint MSc study programme in the field of civil engineering oriented towards road infrastructure (roads and bridges). Beforehand, the programme was a specialization on the master course of civil engineering at the Faculty of Civil Engineering, VGTU. Another reason to prepare the programme was the fact that the Faculty of Environmental Engineering at VGTU has a very strong department for roads, while RTU is well-known for its bridges department.

The main aim of the programme is to educate master degree graduates of civil engineering to be able to apply the gained theoretical and practical knowledge in the field of civil engineering, with special focus on the problems of road infrastructure (roads and bridges) and problems connected to this field. The aim is well formulated and interesting for the industry because of integration of the parts of infrastructure (roads) with the knowledge of building structures (bridges). Respecting the SER (p. 28) and the answers from the stakeholders, the need of the newly established study programme is based on the demand for modern specialists in road and bridge engineering with a strong focus on infrastructure. Graduates may take leading positions at the state or municipal road sector management or maintenance entities or institutions, road research, maintenance, technical supervision, design or construction companies and organizations.

The aim and learning outcomes are well defined and publicly accessible on the faculty web site <https://medeine.vgtu.lt/programos/prosritys.jsp?kva=M&pg=s&metai=2016&klb=en>. They can be obtained from the Open Information and Counselling System (AIKOS): (<http://www.aikos.smm.lt/aikos/index.htm>) and the website of Association of Lithuanian Higher Education Institutions (LAMA BPO) (<http://www.lamabpo.lt>). The aim of the programme is realistic; the output is useful for current needs of the stakeholders in Lithuania, as well as abroad. Additionally, as was pointed out in the meeting with the stakeholders, the government research revealed a lack of civil engineers of such profile in Lithuania. The stakeholders expect the graduates of the programme to have better salary prospects and career opportunities than first-cycle graduates.

Studies last 1,5 years (90 ECTS credits) which is not compatible with the Civil Engineering or Structural Engineering MSc programmes which have 120 credit points. According to the management interviewed during the site visit, the reason for the decision to choose 90 ECTS (and not 120 ECTS for example) lies in the fact that study funding in Latvia is time limited.

It is written in the SER (p. 7) that the graduates should be able to integrate and to employ road system management theories, innovative road and bridge design and technology engineering

knowledge in a complex manner, which encompass the progress in construction, economics and other sciences and technologies. Besides, they are expected to be ready for independent improvement through all life studies in the area of civil engineering sciences.

The review team would like to underline that, due to the fact that there are no graduates from the programme yet, they did not have any opportunity to take a view into the content of the master thesis and consequently to assess real outcomes of the study skills. However, after the site visit and a deep discussion with the group of the stakeholders, the review team shares an opinion that for complex problems of advanced bridge engineering to be solved specialised structural engineers are still needed; they cannot entirely be replaced by graduates of this programme. There is no conflict with the programme's aim if that qualification is kept transparent. Basic work of urban planning also has still to be done by dedicated urban planners (BSc).

Additionally, there is still a problem with the professional certification of the programme's graduates by the Lithuanian engineering assembly. There is no such specific profile of engineers to be officially recognized by any engineering assembly in Lithuania, which can in future decrease an interest for such study programme without any professionally recognized classification.

With a view to the title of the subjects the review team wondered whether the attribute "innovative" refers to the content. Eventually, they agreed that the programme can be regarded as innovative with respect to the cooperation between the two universities of Riga and Vilnius. Disregarding this nuance, according to the curriculum, descriptions of the subjects and the meetings held the review team has gained the opinion that the title of the programme is compatible with the content and the qualifications. The programme consists of many interesting research and professional topics from the field of traffic flows (subject "Road Integrated Research"), traffic safety and management (subject "Traffic Safety Management") which can directly be implemented into the field of road infrastructure (including bridges). The learning outcomes, content and the qualifications offered are compatible with each other, though, as mentioned above, complex structural problems still have to be solved by the graduates of the Master study programme "Structural Engineering", 621H21001.

## ***2.2. Curriculum design***

The programme includes subjects of the study subjects worked out by VGTU and RTU academics. The structure of the programme has been coordinated observing the requirements for the Lithuanian and Latvian master degree study programmes. The total volume of the programme is 90 ECTS, thus within the legal limits of between 90 and 120 ECTS. The subjects of the study field of Civil Engineering make up 84 credits (prescribed minimum: 60) in total, including the Master thesis.

The number of subjects studied during one semester is 5 in the first semester (3 compulsory and 2 optional subjects), 5 in the second semester (4 compulsory and 1 optional subject) and 1 optional in the third semester. The numbers of the subjects therefore satisfy the prescribed conditions (the number of subjects studied during one semester within a programme must not exceed 5). The final thesis consists of 30 credits (3 in the first semester, 3 in the second semester and 24 in the last semester) and therefore satisfies the condition prescribed (no less than 30 credits for preparation and final thesis defence, or for final thesis and final exam). According to the facts given, the review team conclude that the curriculum design meets all legal requirements posted in “Approval of the general requirements for master degree study programmes”, No V-826 of 3 June 2010, Vilnius. As for the Latvian part of the programme, SKVC inquired the Latvian Quality Agency of the Latvian side of the Programme and they confirmed all Latvian legal requirements are met.

The structure of the curriculum in the first semester is organized in a way that students get basic knowledge about the road and bridge profession. The subject “Scientific research and innovations” at the beginning of the course offers students a good opportunity to get basic knowledge about research. The content of the subject “Nonlinear Analysis of Reinforced Concrete Bridges“ with 6 ECTS from the first semester including the topics of non-linear behaviour and fracture mechanics assures a deep and huge theoretical background of the topics to be discussed in further subjects about other road infrastructure elements. The subject „Innovative Pavement Structure Design“ with 6 ECTS deepens the students' knowledge of selecting and designing methods of road pavement structures, design of road pavement structures, specific features of different pavement structures and their functioning. In the first semester there are two groups of elective subjects; one from the field of traffic and roads and one from the field of bridges. Students have an opportunity to choose one subject from each group. Additionally, it is interesting and an important strength that students start with the Master Graduation Thesis already in the first semester. The subject of the thesis can be chosen from the fields of “Roads”, “Bridges” or “Roads and Bridges”.

Descriptions of all subjects are well prepared and publicly available for the students. However, the review team found that there are some books prescribed by the subjects which are available only either in Lithuanian or in Latvian languages and not in English.

The content of the subjects and the teaching methods (combination of theoretical knowledge with practical examples by many subjects) are appropriate for the achievement of the intended learning outcomes. As there are still no graduates on the programme it was not possible to assess the quality of the master thesis. However, on the meeting with the stakeholders it was especially exposed that there is a great demand for such a profile of graduates.



The content of the programme reflects the latest achievements in science and technologies. From the reading lists of the subjects' descriptions it is evident that mostly the latest international research literature (books, monographs, journals) from the field of roads and bridges is prescribed for the study work. Many interesting topics from the latest research can be found in the subject descriptions.

The only remark to the curriculum is dedicated to the fact that the subject "Steel-concrete Composite Bridge" is elective in the first semester and the subject "Innovative Timber and Reinforced Concrete Bridges" is compulsory in the second semester. Consequently, there is a possibility that students can avoid the content of steel bridges to the end of the study and will lack this knowledge. Therefore, the review team recommend "Steel-concrete Composite Bridge" to be a compulsory subject.

### ***2.3. Teaching staff***

The programme is provided by the staff meeting legal requirements. The list of teachers consists of teachers from VGTU and RTU. During the study period 2015/2016 19 teachers held lectures, 14 teachers from VGTU, but only 5 from RTU. This mismatch has to be explained because the programme has equal teaching load in ECTS points (1 semester in Vilnius and 1 semester in Riga). According to the faculty, the reason for the difference in the number of teachers from the two institutions involved lies in the fact that most of the elective subjects are available at VGTU only.

Two teachers at VGTU do not have a scientific degree, but the legal regulation in Lithuania indicating that no less than 80% of university study programme teachers have to have a scientific degree is met, because in total 88.24% of teachers (85.72% on VGTU, 100% on RTU – 100%) had scientific degrees during the period analysed. Additionally, the review team checked the number of teachers' publications in reputable international scientific journals. From analysing the scientific reputation of the teachers from both institutions it can be concluded that it is sufficient to ensure a high scientific level of the study process. Analysing the research results for the last five years and according to the data available in SER p. 17 one teacher of the programme has in average 3.63 of papers published in ISI Web of Science (VGTU – 4.00, RTU – 2.60) and 1.79 of publications (VGTU – 1.64, RTU – 2.20) in ISI Proceedings on average. There were 10.74 publications per one programme teacher (VGTU – 10.64, RTU – 11). Having in mind that the programme is joint with a common study process it is important that the disproportion between the research results for teachers from both universities isn't big.

Apart from the two journals edited by the both institutions and indexed by a high impact factor, the teaching staff published 23 journal papers in other international SCI journals in the last five-year period. This means 1.21 papers/teacher, which can be regarded as a reasonable number for an academic institution. According to the facts presented, the review team concluded that the qualifications of the teaching staff are adequate to ensure learning outcomes.

As mentioned before, 19 teachers in total gave lectures in the last study year. However, it is important to underline that, according to the data presented in SER p. 16, only 47.37% of teaching staff have full-time employment, whereas 52.63% of teachers are employed part-time. This fact strongly influences the time-table at VGTU where the lectures are mostly delivered in the afternoon only. Analysing the dynamics of the number of teachers and students it was observed that 13 students were studying in the programme in the last study year 2015/2016. The general ratio between teachers and students was therefore  $19/13=1.46$ , which seems adequate to ensure learning outcomes. During the analysed study period in 2015/2016, 42.11% of all teachers involved in the programme were full professors, 42.11% were associate professors, 5.26% were lecturers and 10.53% were assistants. During this period the distribution of teachers according to their gender did not comply with the requirements of European Union as men amounted to 84.21% and women amounted to 15.79%.

Another important factor is academic experience. 10.53% of all teaching staff have up to 5 years of academic experience, 52.63% 6 to 20 years and 37.84% more than 20 years. The analysis of teachers' academic experience has shown that the teachers have great pedagogical experience, which is sufficient for the programme. The teachers are appointed for five years at a time. Their position is permanent after  $2 \times 5$  years, but they still have to get certification every five years.

All three faculties included in the joint programme strongly support the conditions for professional development of the teaching staff, such as active participation on the scientific national and international conferences, symposiums, etc. Additionally, every three years the Faculty of Civil Engineering organises an international conference called "Modern Building Materials, Structures and Techniques", where young scientists of Civil Engineering and Environmental Engineering Departments present their research results. RTU Faculty of Civil Engineering, in cooperation with industry partners, organizes an international conference called "Innovative Materials, Design and Technology". The faculties require teachers to attend courses to improve their pedagogical skills.

Although the faculties involved have signed more than 80 bilateral Erasmus agreements, the main weakness of the teaching staff lies in insufficient international exchange. Very few teachers from other countries come for study and research purposes for a longer period than 1-2 weeks (only

two in the last study year). It was highlighted at the meeting with the management that in this study year they have two visiting professors, paid for by special funding. The faculties are working in a team to improve this, like creating personal links by sending staff out to other universities. This quality has to be strongly improved in the future. As a joint programme performed in English, it could be attractive for international students and would rapidly increase the number of students and teachers coming from abroad.

#### ***2.4. Facilities and learning resources***

The programme is conducted at both universities (VGTU and RTU). Academic sessions at VGTU take place at Civil Engineering and Environmental Engineering Faculties, located at the same address 11 Saulėtekio al., Vilnius. Enough classrooms and laboratories are available for a quality performance of the study process. The review team can conclude that all classrooms at VGTU are equipped with stationary multimedia devices for teachers to give exercises and lectures comfortably. Nearly all new facilities have been financed by external income, internal funds or social partners' support. There are two computer rooms; SRL-I 520 with 25 workplaces and SRK-II 401 with 15 workplaces. Two computer rooms with 34 workplaces for students are available at the Road Department. There are also adequate arrangements for students' practice (a special room where they can prepare the models of the bridges to get a really good impression of the structural behaviour of bridges and can test them until failure using electronic testing machines). Students can work on individual tasks at the Civil Engineering and Business Management reading-room Saulėtekio al., Central building, C 103, also there is enough place to prepare the models of the tested samples.

The classrooms are well equipped with office facilities (laptop computers, projectors, monitors, laser pointers, copy machines, laser and ink printers, ink plotters) required to conduct lectures. The students have access to wireless internet when needed. All classrooms are equipped with minimum supplies for studies: writing boards, sockets for hardware connection, computers with projectors, desks, chairs and the like. Different software can be relied on during training sessions: office software package MS Office, computer graphics software AutoCad, AutoCad Civil 3D, ArcView 3.2 and ArcView 8.3 Geographic information system software, Lithuanian spatial view mapping M1:50000 Vector database; Lithuanian Geo-information database GDB200 (M1:200000). Exceptionally legal software is used in the education process and includes numerous specialized structural analysis and graphic modelling packages: StaadPro, Lira, Autodesk Robot Structural Analysis, Matrix CAE, Solidworks, Bentley Microstation, Bentley Building, Revit and others.

In order to satisfy study needs students have a possibility to use the VGTU library premises (Saulėtekio al. 14); General Reading Room (room 201), Scientific Information Reading Room (room

217), and the reading room, open 24/7. There are 35 workplaces, 12 of them are computerized with Matlab, AutoCAD, ArcGIS, SolidWorks and other necessary software. There is a free access to 30 international databases, mostly funded by the EU. The library is well equipped with reputable international journals, which are available for the students for free and offer them a good overview of the latest research findings from practically all fields of road and bridge engineering. The most important available journals are for example International Journal of Pavement Engineering (ISSN 1029-8436 print / ISSN 1477- 268X online), Road Materials and Pavement Design (ISSN 1468-0629 print / ISSN 2164-7402 online), Canadian Journal of Civil Engineering (ISSN 0315-1468 print / ISSN 1208-6029 online), ACI Structural Journal (ISSN 0889-3241); Bauingenier (ISSN 0005-6650); Bridge Engineering (ISSN 1048-0702); Geotechnique (ISSN 1048-0702), Journal of Composites for Construction (ISSN 0733-9364), Journal of Material in Civil Engineering (ISSN 0899-1561), Journal of Structural Engineering (ISSN 0733-9445), Steel and Composite Structures (ISSN 1229-9367), Structural Engineering and Mechanics (ISSN 1225-4568). Unfortunately, there is usually only one hard copy of each English book available for the students.

According to the facts given, the material base for studying seems adequate. However, in some of the study subjects' descriptors (e.g. the subjects "Scientific researches and innovations" and "Master Graduation Thesis", etc.) the main literature references presented are provided only in Lithuanian and in some other subjects (Pedagogy, Psychology) only in Latvian. This raises concern whether students will be able to study efficiently having only literature in a foreign language since students are from two different countries speaking different languages and the programme is performed in English only.

## ***2.5. Study process and students' performance assessment***

### **Admission requirements and procedure**

The admission of students follows the authorised national accreditation institutions – endorsed procedures and rules on the admission to Master's degree programmes. The official admission requirements are clearly presented on the web page: first-cycle studies in civil engineering or transport/traffic engineering; first-cycle university studies close to the programme. The individuals, having acquired at least bachelor's qualification degree or having mastered a contiguous university education, are admitted to the programme. Provided the individuals have completed the first cycle studies the nature of which is close to the programme, mandatory Bachelor curriculum subjects and minimal scope of them are obligatory: 1) Basic study subjects: Mathematics 15 ECTS, Physics 6 ECTS, Engineering graphics 5 ECTS, Information technologies 5 ECTS, Mechanics 12 ECTS. 2) Special programme subjects: engineering geodesy, transport structures/facilities, bridges,

reinforced concrete transport structures/facilities, metal transport structures/facilities, construction materials, road construction materials, motor road and railway design, computer design of structures) 25 ECTS.

According to these two requirements the study subjects for fulfilling the entrance criteria have been identified. However, the formula used for assessing the fulfilment of the criteria are not given in the SER. Additionally, English language is necessary for enrolment (the programme is performed in English language only), but there is no information provided what level of language prospective students must have and how it affects entrance criteria.

### **Organisation of the study process**

From the direct communication with the students (there was only one student from the third semester present, and two students from the first semester) it was conveyed that the timetable of the study process was organized according to the students' needs. For example, in the first year of the programme (study year 2015/2016) all lectures were delivered only in the afternoon and in the evening (between 16:20 and 21:30). However, the students from the first semester explained that the study process in this study year is performed in block modules (day-time study with 2 weeks of lectures, after that 2 weeks of individual study), which is completely different from the first year of the implementation of the study programme. The problem, as it was understood, is that the students who started studies in this year were not aware or informed about changes in organising timetable. Also the reasons for this change were unclear. The scheduling of exams also appears to differ from the way it had been conducted the year before, without either the students or the management being able to exactly explain the current exam schedule. At the moment there is also a mismatch between VGTU and RTU timetables. This may not be a problem if the students can rely on both systems being stable, but may well be one in case of continual changes at short notice. Obviously, the programme is still in a testing procedure of various timetable and exam schedules, which might not currently pose a problem but points to requirements for management to secure more stable conditions (these problems are addressed in Chapter 2.6).

### **Students 'events**

Students are generally encouraged to participate in research, applied research and artistic activities. There are many organized events for students to participate actively in various projects. Cooperation between the faculties and companies is generally good; however, there is no direct communication yet between stakeholders and students in common projects in which students can actively participate.

### **International mobility**

Students generally have opportunities to participate in student mobility programmes like Erasmus, Erasmus +, Leonardo da Vinci, CEEPUS. The two faculties involved from VGTU have signed more than 80 signed bilateral Erasmus agreements. According to the data presented on p. 28 of SER eight Latvian students came to study under the Erasmus+ programme at VGTU for the autumn semester of 2015/2016 and six Lithuanian students went to study at RTU for the spring semester. However, these are only the students from the institutions involved in the study programme; there are no figures available about the number of the students from other countries, such as those included in the Erasmus programme exchange. As this is a joint international programme performed in English language one might expect to have more active international mobility from the EU and other countries.

### **Academic and social support**

The SER gives details on academic and social support, both of adequate level. VGTU provides grants and scholarships for motivational scholarships (nominal scholarships and other scholarships awarded for good academic results). The stay of Lithuanian students for one semester in Latvia (and vice versa) is covered by Erasmus grants; €240 (Lithuania), €500 (Latvia).

### **The assessment system of students' performance**

The assessment criteria of the learning outcomes are indicated in the study subject descriptions. The assessment system of the subjects is given in its description. Generally, the assessment system is clear and detailed. One part of the final result consists of compulsory tasks performed during the semester; the other part is for the exam undertaken during the exam session. This helps to distribute student workload evenly during the semester. The timetable of examinations is coordinated between administration, students and teaching staff. The assessment of examinations, course works and credits are available to each student in the information system (<https://medeine.vgtu.lt/studentams.html>). The defence results of the course projects are submitted into the university information system (UIS) exams database before the beginning of the session.

### **Assessment of the pedagogical process:**

Students can complete the survey questionnaire and give their opinions on each subject taught and on the teacher after the exams. If a teacher during his/ her tenure (5 years) did not receive positive reviews he/ she may not be certified for further pedagogical work in VGTU. The results are discussed at the department meetings, the faculty dean's office meetings, and, twice a year, at the rectorate's meetings, during which conclusions are drawn.

### **Professional activities of the majority of graduates:**

As there has been no cohort of graduates so far (the programme started in 2015/2016), the demand for the specific profile of graduates can be based on the results of various reports and

research on the previous specialization of the programme only, and on the opinions obtained from the stakeholders. According to the feedback obtained from the social partners there is a lack of such qualified engineers in Lithuania and in the whole Baltic area as well.

## **2.6. Programme management**

This is a joint study programme of two institutions (VGTU Vilnius and RTU Riga) with three faculties involved: VGTU Faculty of Environmental Engineering, VGTU Faculty of Civil Engineering and RTU Civil Engineering Faculty. Although the programme is classified in the field of civil engineering it is managed by the Faculty of Environmental Engineering. At the meeting with the management of the two faculties involved it was explained that the Civil engineering faculty is already represented with their partners in Riga.

According to the SER (p. 29) the process of the programme and quality assurance, as well as responsibilities of the programme implementers are described in documentations at different levels. All information regarding the execution of the programme is stored in the VGTU information system “AlmaInformatika”. After the review of SER and taking into consideration the feedback obtained from the meetings with the management of both VGTU faculties (there was no possibility to visit RTU), the review team conclude that responsibilities for decisions and monitoring of the implementation of the programme are clearly allocated. They are subdivided into two main groups:

- The Study Programme Committee is responsible for supervising and updating of the programme in accordance with the VGTU regulations, approved in 2013. The SPC is subordinates to the AIF Dean and the Faculty Study Committee (SER, p. 28). The SPC is also responsible for the preparation of the annual self-assessment of the programme. The SPC consists of 3 members (teachers) from VGTU and 3 representatives from RTU. However, there is only one students representative who was elected by fellow students of the complete VGTU/RTU programme.
- The Council is responsible for programme management, content and overall structure of the programme. The Council supervises the development and implementation of the programme and controls the quality.

It was explained during the meeting with the staff responsible for the preparation of the SER that the SPC had two meetings during the semester in the previous year, discussing and analysing all problems related to the performance of the programme (timetables, exams, possibilities for further employment, etc.). Many meetings were also organized with stakeholders on issues of the quality of the study programme. Therefore, it can be concluded that information and data on the implementation of the programme are regularly collected and analysed. The review team noted also

that the SER was prepared correctly. However, the review team did not see that the outcomes of internal evaluations of the programme are used for the improvement. That may be due to the programme having started for the first time in October 2015.

The SPC is also responsible for students survey on the study process and the influence of survey results on the quality of the study process. However, the students pointed out that they do not see changes when they fill in surveys at the end of semester. Therefore, a system should be created to help students see these changes or collect students' opinion in the middle of the semester for teachers to get results early and for students to see change.

The review team also strongly recommend to increase the number of students representative to two (one student from VGTU and one from RTU).

Despite a clear structure of the curriculum, there is a problem regarding some references of study subjects descriptions. In the view of the review team, it should be addressed by programme management because students need to have all necessary references clearly indicated in the subjects description.

In an effort to ensure the teaching quality across the whole faculty, the visits of the lectures by vice-deans and heads of the departments were introduced in 2013. The visiting schedule also takes into account surveys results, competence of teaching staff etc. Additionally, it is a positive fact that a special pedagogical programme for young researchers has been started, and pedagogical courses for professors are compulsory too (4-8 hrs per year). Also, it is positive to see that entire community of VGTU is taking measures to prevent academic dishonesty. As to the tutorial system, it should be organised better and more efficiently. For example, the commission recommends additionally establishing the tutorials according to the study fields (separately for roads and bridges).

In contrast to the statements of the SER, the review team identified also problems with the day-to-day management of the programme. First of all, the faculty was not able to provide the current timetable even one day after being asked for it but produced last year's timetable instead. The information given by students confirmed the impression that there is still a lot of improvisation in the process. As a consequence, the study process at VGTU was changed significantly this year. Whereas in the first study year (2015/2016) all lectures were held in the afternoon and evening time only, in the current study year (2016/2017) the study process is performed during day time with alternating two weeks of lectures and two weeks of individual study. The peers were told by the management that this change was done to the students' benefit. As the students interviewed knew either the old or the new version, but not both, the peers were not able to prove or disprove this assertion. Anyhow, the change has led to a mismatch between the timetable structures of VGTU and RTU. That might not be a major problem but should be addressed as a potential one. Unfortunately, there was no



Latvian student present for the interviews, so the peers were not able to verify or falsify their position. As there were Latvian students in the laboratories, the peers wondered why there was none present in the interviews.

From these observations the review team concluded that, although the procedures are in place theoretically, there is still much improvisation in practice. By the time of the next reaccreditation the programme management should have settled to a more stable state.

**General observation / general remark:** The historic structure of the university leads to overlap and a high number of programmes. Decreasing the number of programmes would help improve the utilisation of resources (esp. staff) and free resources for research and attracting students.

### **2.7. Examples of excellence \***

The innovation can be dedicated to integration of two different professional fields of infrastructure (roads and bridges) where one institution is responsible for roads and another one for bridges. The study programme is in this sense is a unique in the Baltic region.

### III. RECOMMENDATIONS

1.

The study process at VGTU was reorganized according to students' needs, so that the timetable is not established yet and differs between VGTU and RTU. Various schedules are still being tested and at the moment there is a mismatch between VGTU and RTU, which will have to be resolved in the future.

2.

The review team shares an opinion that for complex problems of advanced bridge engineering to be solved specialised structural engineers are still needed; they cannot entirely be replaced by graduates of the programme. There is no conflict with the programme's aim if that qualification is kept transparent; still, it is highly recommended that the subject "Steel-concrete Composite Bridge" be included in the list of compulsory subjects.

3.

Although both faculties from VGTU have signed more than 80 bilateral Erasmus agreements the main weakness of the teaching staff lies in insufficient international exchange. It is a joint programme, therefore it is strongly recommended to increase the number of visiting professors and incoming students.

4.

The tutorial system for students should be organised better and more efficiently. Therefore, it is recommended to establish additionally the tutorials according to the study fields of the programme (separately for roads and bridges).

5.

In some of the study subjects' descriptors the main references are only in Lithuanian, and in some other subjects only in Latvian. This raises concern whether students will be able to study efficiently as they have only literature in a foreign language, whereas the programme is performed in English only. All the literature recommended for the subjects should be available in English.

6.

The Study Programme Committee has to be extended with one additional member from the students (one student from VGTU and one from RTU).

7.

The output profile of the graduates should be professionally recognized by a national engineering assembly.

#### **IV. SUMMARY**

The study programme is a joint programme provided in English language. The programme can be attractive for international students and could rapidly increase the number of students coming from abroad. The programme is well-adapted to what the employers expect the graduates to do in their future jobs. There is a lack of such qualified engineers in Lithuania and in the whole Baltic area.

There is very good co-operation between the organisations involved into the programme (VGTU and RTU) on an international and a personal level.

The cooperation between teachers from roads and bridges departments is very good.

The equipment of the laboratories is very modern.

The analysis of the data shows that the number of students admitted to the programme from both universities is distributed very evenly (8 in Lithuania and 8 in Latvia).

Generally, the main positive aspect is dedicated to integration of two different important professional fields of infrastructure (roads and bridges) into one master study programme where one institution is responsible for roads and another one for bridges and can really be a good example for further accreditations of such programmes.

It has been concluded after the meeting with the stakeholders that for complex problems of advanced bridge engineering to be solved specialised structural engineers are still needed; they cannot entirely be replaced by graduates of the programme. Some improvement would come from the subject “Steel-concrete Composite Bridge” being included in the list of compulsory subjects. Yet, the basic work of urban planning and design still has to be done by dedicated urban planners (BSc graduates).

Regarding the curriculum, it was found that in some of the study subjects’ descriptors (Scientific researches and innovations, Master Graduation Thesis) main references are provided only in Lithuanian and in some subjects (Pedagogy, Psychology) only in Latvian. This raises concern whether students, who are from two countries, will be able to study efficiently having only literature in a foreign language. English language is necessary for enrolment but there is no information provided what level of language students must have to be admitted and how it affects entrance criteria. Considering the curriculum design it has been concluded that more solutions-oriented instead of design-practice oriented teaching would be commendable. Most of the elective subjects are available at VGTU only.

Analysing the teaching staff it was observed that very few teachers from other countries come for study and research purposes for a longer period than 1-2 weeks. This number definitely has to be increased.

The stay of Lithuanian students for one semester in Latvia (and vice versa) is covered by Erasmus grants, but the amount of the financial support is completely different.

The Study Programme Committee consists of 3 members (teachers) from VGTU and 3 representatives from RTU. There is only one representative of the students (from VGTU). This number has to be increased (one student from VGTU and one from RTU).

Study Programme Committee is also responsible for students survey on the study process and the influence of survey results on the quality of the study process. However, the students pointed out that they do not see changes when they fill in surveys at the end of semester. Therefore, a system should be created to help students see these changes or collect students' opinion in the middle of the semester for teachers to get results early and for students to see change.

The main disadvantage of the programme is observed in the organization of the study process which is performed according to student's needs. The peers found that the timetable is not established and differs between VGTU and RTU. Lectures are held in the evenings in order for students to cope with their work. That is not a good situation for the Latvian students, who do not tend to work in Lithuania. Thus, it seems that the programme performance is still being tested in terms of timetable schedules and at the moment there is a mismatch between VGTU and RTU. This fact definitely has to be improved.

Specific profile of engineers (graduates of the programme) is not officially recognized by any engineering assembly in Lithuania. This fact can in future decrease an interest for the study programme.

## V. GENERAL ASSESSMENT

The study programme *Innovative Road and Bridge Engineering* (state code – 628H20001) at Vilnius Gediminas technical University is given **positive** evaluation.

*Study programme assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation of an area in points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Teaching staff	3
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	3
6.	Programme management	2
	<b>Total:</b>	<b>17</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. dr. Haldor Jochim**

Grupės nariai:

Team members:

**Prof. dr. Miroslav Premrov**

**Assoc. Prof. dr. Tone Merete Muthanna**

**Assoc. Prof. dr. Jelke Dijkstra**

**Dr. Dalė Daunoravičiūtė**

**Ignas Gaižiūnas**

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO ANTROSIOS PAKOPOS STUDIJŲ PROGRAMOS *INOVATYVI KELIŲ IR TILTŲ INŽINERIJA* (VALSTYBINIS KODAS – 628H20001) 2017-03-14 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-53 IŠRAŠAS**

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**V. APIBENDRINAMASIS ĮVERTINIMAS**

Vilniaus Gedimino technikos universiteto studijų programa *Inovatyvi kelių ir tiltų inžinerija* (valstybinis kodas – 628H20001) 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	3
6.	Programos vadyba	2
	<b>Iš viso:</b>	<b>17</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)

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**IV. SANTRAUKA**

Tai yra jungtinė studijų programa, vykdoma anglų kalba. Ji gali būti patraukli tarptautiniams studentams ir galėtų greitai padidinti užsienio studentų skaičių. Studijų programa puikiai atitinka darbdavių lūkesčius būsimųjų absolventų atžvilgiu. Lietuvoje ir visame Baltijos regione trūksta tokių kvalifikuotų inžinierių.

Studijų programą vykdančios institucijos (VGTU ir RTU) puikiai bendradarbiauja tarptautiniu ir asmeniniu lygiu.

Kelių ir Tiltų katedrų dėstytojų tarpusavio bendradarbiavimas taip pat puikus.

Laboratorių įranga labai moderni.

Duomenų analizė rodo, kad į studijų programą priimtų studentų skaičius abiejuose universitetuose pasiskirstęs vienodai (8 Lietuvoje ir 8 Latvijoje).

Apskritai, pagrindinis teigiamas dalykas yra dviejų skirtingų svarbių profesinių infrastruktūros sričių (kelių ir tiltų) sujungimas į vieną magistrantūros studijų programą, kurią vykdydama viena institucija yra atsakinga už kelių sritį, o kita – už tiltų sritį, ir kuri iš tiesų gali būti puikus pavyzdys tolesniam tokių programų akreditavimui.

Po susitikimo su socialiniais dalininkais ekspertų grupė padarė išvadą, kad siekiant spręsti sudėtingas pažangiosios tiltų inžinerijos problemas, vis dar reikalingi statybinių konstrukcijų inžinieriai-specialistai; jų negali visiškai pakeisti šios studijų programos absolventai. Studijų kokybė pagerėtų, jei į privalomųjų dalykų bloką būtų įtrauktas dalykas „Kompozitiniai plienbetoniniai tiltai“.

Tačiau būtent urbanistinio planavimo specialistai (bakalauro studijų programos absolventai) turėtų diegti urbanistinio planavimo ir projektavimo pagrindus.

Kalbant apie studijų turinį, pastebėta, kad kai kurių studijų dalykų aprašuose („Moksliniai tyrimai ir inovacijos“, „Magistro baigiamasis darbas“) pagrindinė literatūra nurodyta tik lietuvių kalba, o kai kurių kitų dalykų („Pedagogika“, „Psichologija“) – tik latvių kalba. Kyla abejonių, ar studentai iš dviejų valstybių galės veiksmingai studijuoti, jeigu literatūra bus tik užsienio kalba. Į priėmimo reikalavimus įtrauktos anglų kalbos žinios, tačiau nėra jokios informacijos, kokio lygio jos turi būti ir koks jų poveikis vertinant priėmimo kriterijus. Kalbant apie programos sandarą, pageidautina dėstyti orientuoti labiau į sprendimus, o ne į projektavimo praktiką. Dauguma pasirenkamųjų dalykų dėstomi tik VGTU.

Vertinant personalą, pastebėta, kad labai nedaug dėstytojų atvyksta iš kitų šalių studijų ar tyrimų tikslais ilgesniam nei 1–2 savaitių laikotarpiui. Šį skaičių būtina didinti.

Lietuvos studentų vieno semestro studijos Latvijoje (ir atvirkščiai) finansuojamos programos „Erasmus“ stipendijų lėšomis, tačiau finansinės paramos sumos visiškai skiriasi.

Studijų programos komitetą sudaro 3 nariai (dėstytojai) iš VGTU ir 3 atstovai iš RTU. Yra tik vienas studentų atstovas (iš VGTU). Jų skaičių reikėtų didinti (vienas studentas iš VGTU ir vienas – iš RTU).

Studijų programos komitetas taip pat atsako už studentų apklausas dėl studijų eigos ir tų apklausų rezultatų poveikį studijų eigos kokybei. Vis dėlto, studentai pabrėžė, kad nors semestro pabaigoje pildo apklausas, pokyčių nemato. Todėl reikėtų sukurti sistemą, padėsiančią studentams pamatyti šiuos pokyčius, arba rinkti studentų nuomones semestro viduryje, kad dėstytojai galėtų anksti susipažinti su rezultatais, o studentai pamatytų pokyčius.

Pagrindinis studijų programos trūkumas yra studijų eigos organizavimas, vykdomas atsižvelgiant į studentų poreikius. Ekspertai pastebėjo, kad tvarkaraštis dar nenusistovėjo ir jis skiriasi VGTU ir RTU. Paskaitos vyksta vakarais, kad studentai galėtų dirbti. Tai nėra palanku Latvijos studentams, kurie neketina dirbti Lietuvoje. Taigi, atrodo, kad studijų programos vykdymas vis dar bandomajame etape, nes šiuo metu nesutampa VGTU ir RTU paskaitų tvarkaraščiai. Šį aspektą būtina gerinti.

Specifinės inžinierių (studijų programos absolventų) kvalifikacijos oficialiai nepripažįsta jokia Lietuvos inžinierių sąjunga. Ateityje tai gali sumažinti susidomėjimą šia studijų programa.

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### **III. REKOMENDACIJOS**

1. Studijų eiga VGTU buvo perorganizuota atsižvelgiant į studentų poreikius, todėl dar nenusistovėjo tvarkaraštis, kuris VGTU ir RTU skiriasi. Vis dar išbandomi įvairūs tvarkaraščių variantai, todėl šiuo metu yra neatitikimų tarp VGTU ir RTU, kurie turės būti išspręsti ateityje.
2. Ekspertų grupė yra tos nuomonės, kad siekiant spręsti sudėtingas pažangiosios tiltų inžinerijos problemas, vis dar reikalingi statybinių konstrukcijų inžinieriai-specialistai; jų negali visiškai pakeisti šios studijų programos absolventai. Jeigu bus išlaikomas šios kvalifikacijos skaidrumas, nebus prieštaraujama programos tikslui; vis dėlto labai rekomenduojama į privalomųjų dalykų bloką įtraukti dalyką „Kompozitiniai plienbetoniniai tiltai“.
3. Nors abu VGTU fakultetai pasirašė daugiau nei 80 dvišalių „Erasmus“ susitarimų, pagrindinis personalo srities trūkumas yra nepakankamas dalyvavimas tarptautinių mainų programose. Ši studijų programa yra jungtinė, todėl labai rekomenduojama didinti kviestinių dėstytojų ir atvykstančiųjų studentų skaičių.

4. Studentų konsultavimo sistema turėtų būti organizuojama geriau ir veiksmingiau. Todėl rekomenduojama papildomai nustatyti konsultavimo sistemas pagal programos studijų sritis (atskirai kelių ir tiltų).
5. Kai kurių dalykų aprašuose pagrindiniai literatūros šaltiniai nurodyti tik lietuvių kalba, o kai kurių kitų dalykų – tik latvių kalba. Kyla abejonių, ar studentai galės veiksmingai studijuoti, jeigu studijų literatūra bus tik užsienio kalba, kai pati studijų programa dėstoma tik anglų kalba. Visa rekomenduojama literatūra turėtų būti prieinama ir anglų kalba.
6. Studijų programos komitetą reikėtų papildyti studentų atstovu (vienu studentu iš VGTU ir vienu – iš RTU).
7. Absolventų profesinę kvalifikaciją turėtų pripažinti nacionalinė inžinierių sąjunga.

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### **2.7. Išskirtinės kokybės pavydžiai\***

Inovatyvumą demonstruoja dviejų skirtingų profesinių infrastruktūros sričių (kelių ir tiltų) integracija, kai viena institucija atsako už kelių sritį, o kita – už tiltų sritį. Šiuo atžvilgiu studijų programa yra unikali Baltijos regione.

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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)