CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

EVALUATION REPORT

STUDY FIELD of MEASUREMENT ENGINEERING

at Vilnius Gediminas Technical University

Expert panel:

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2. **Assoc. Prof. dr Peregrina Eloina Coll Aliaga,** *academic;*
3. **Mr Audrius Petkevičius,** *representative of social partners;*
4. **Ms Miglė Gervytė,** *students' representative.*

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Report language – English

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Study Field Data*

Title of the study programme	***Geodesy and Geoinformatics***	***Geodesy and Cartography***	***Innovative Solutions in Geomatics****
State code	*6121EX036*	*6211EX036*	*6281EX001*[1]
Type of studies	University studies	University studies	University double-degree studies
Cycle of studies	Bachelor's Degree (1st cycle)	Master's Degree (2nd cycle)	Master's Degree (2nd cycle)
Mode of study and duration (in years)	Full-time (4)	Full-time (2)	Full-time (1,5)
Credit volume	240	120	90
Qualification degree and (or) professional qualification	Bachelor of Engineering Sciences	Master of Engineering Sciences	Master of Measurement Engineering/Master of Geomatics Engineering
Language of instruction	Lithuanian	Lithuanian	English
Minimum education required	secondary education	Higher education	Higher education
Registration date of the study programme	2013-07-01	2010-06-01	2014-06-02

** if there are **joint / two-fields / interdisciplinary** study programmes in the study field, please designate it in the foot-note*

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[1] A joint degree programme implemented by VILNIUS TECH and Riga Technical University (Latvia).

CONTENTS

I. INTRODUCTION

1.1. BACKGROUND OF THE EVALUATION PROCESS

The evaluations of study fields in Lithuanian Higher Education Institutions (HEIs) are based on the Procedure for the External Evaluation and Accreditation of Studies, Evaluation Areas and Indicators, approved by the Minister of Education, Science and Sport on 17 July 2019, Order No. V-835, and are carried out according to the procedure outlined in the Methodology of External Evaluation of Study Fields approved by the Director of the Centre for Quality Assessment in Higher Education (hereafter – SKVC) on 31 December 2019, Order No. V-149.

The evaluation is intended to help higher education institutions to constantly improve their study process 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 (SER) prepared by HEI; 2) site visit of the expert panel to the HEI; 3) production of the external evaluation report (EER) by the expert panel and its publication; 4) follow-up activities.*

On the basis of this external evaluation report of the study field SKVC takes a decision to accredit study field either for 7 years or for 3 years. If the field evaluation is negative, then the study field is not accredited.

The study field and cycle are **accredited for 7 years** if all evaluation areas are evaluated as exceptional (5 points), very good (4 points) or good (3 points).

The study field and cycle are **accredited for 3 years** if one of the evaluation areas is evaluated as satisfactory (2 points).

The study field and cycle are **not accredited** if at least one of evaluation areas is evaluated as unsatisfactory (1 point).

1.2. EXPERT PANEL

The expert panel was assigned according to the Experts Selection Procedure as approved by the Director of SKVC on 31 December 2019, Order No. V-149. The site visit to the HEI was conducted by the expert panel on *28 November 2022.*

Prof. dr. Krzysztof Czaplewski (panel chairperson), *Professor of Gdynia Maritime University, Poland*
Assoc. Prof. dr. Peregrina Eloina Coll Aliaga, *Associate Professor in the València University of Technology, Spain*
Mr Audrius Petkevičius, *Head of Real Estate practice, Ellex Valiunas, Lithuania*
Ms Miglė Gervytė, *BSc graduate in Genetics, Vilnius University, Master's degree student, Vilnius University*

1.3. GENERAL INFORMATION

The documentation submitted by the HEI follows the outline recommended by SKVC.

1.4. BACKGROUND OF STUDY FIELD OF MEASUREMENT ENGINEERING AT VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

Vilnius Gediminas Technical University (hereinafter – VILNIUS TECH) is a state higher education institution, established by the Seimas of the Republic of Lithuania. The university is a public legal entity, operating as a public body. VILNIUS TECH is one of the largest higher education institutions in Lithuania. VILNIUS TECH has two governing bodies, the Council, and the Senate. The University Council is responsible for the vision and mission of the university, principles of staff recruitment and assessment. The Senate of the University is responsible for the organization of the didactic process, the policy of carrying out scientific and research works, and other matters related to the functioning of the university. University is managed by the Rector. The University has 9 faculties and 1 institute. Studies in the assessed field are conducted at the Department of Geodesy and Cadastre at the Faculty of Environmental Engineering.

Measurement Engineering is one of the most important areas of human activity in Lithuania. The regaining of independence by Lithuania, together with the rapid development of technology, resulted in the need for highly qualified engineers who would meet the requirements of the transformation of the Country. Therefore, the university implements numerous national and international research projects supporting the didactic process and meeting the requirements of

the labour market. Well-educated engineers quickly find their jobs and the acquired knowledge allows them to easily adapt to the needs of the country using the latest measurement technologies.

The external evaluation of the Geodesy and Cartography (first and second cycle) major took place in 2016. Due to the change in the names of the fields of study introduced in Lithuania, the field of study in measurement engineering has not yet been assessed.

II. GENERAL ASSESSMENT

Measurement Engineering study field and *first cycle* at Vilnius Gediminas Technical University is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas

No.	Evaluation Area	Evaluation of an Area in points*
1.	Intended and achieved learning outcomes and curriculum	4
2.	Links between science (art) and studies	4
3.	Student admission and support	3
4.	Teaching and learning, student performance and graduate employment	4
5.	Teaching staff	3
6.	Learning facilities and resources	3
7.	Study quality management and public information	4
	Total:	25

Measurement Engineering study field and *second cycle* at Vilnius Gediminas Technical University is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas

No.	Evaluation Area	Evaluation of an Area in points*
1.	Intended and achieved learning outcomes and curriculum	4
2.	Links between science (art) and studies	4
3.	Student admission and support	3
4.	Teaching and learning, student performance and graduate employment	4
5.	Teaching staff	3
6.	Learning facilities and resources	3
7.	Study quality management and public information	4
	Total:	25

*1 (unsatisfactory) - the area does not meet the minimum requirements, there are fundamental shortcomings that prevent the implementation of the field studies.
2 (satisfactory) - the area meets the minimum requirements, and there are fundamental shortcomings that need to be eliminated.
3 (good) - the area is being developed systematically, without any fundamental shortcomings.
4 (very good) - the area is evaluated very well in the national context and internationally, without any shortcomings;
5 (excellent) - the area is evaluated exceptionally well in the national context and internationally.

III. STUDY FIELD ANALYSIS

3.1. INTENDED AND ACHIEVED LEARNING OUTCOMES AND CURRICULUM

Study aims, outcomes and content shall be assessed in accordance with the following indicators:

3.1.1. Evaluation of the conformity of the aims and outcomes of the field and cycle study programmes to the needs of the society and/or the labour market (not applicable to HEIs operating in exile conditions)

(1) Factual situation

According to the Lithuanian Union of Surveyors and Geodesy Specialists there is a need in the labour and society in professionals of geodesy, geomatics and GIS in Lithuania and the whole world. Graduates in Geodesy and Geoinformatics (hereinafter – GD), Geodesy and Cartography (hereinafter – GISmf) and Innovative Solutions in Geomatics (hereinafter – ISGmf) study programmes can fulfil those needs.

These programmes aim to teach about the newest technologies of geodesy, geomatics, remote sensing and GIS. Since this is an evolving field, according to the SER, the students are invited to participate in activities related to their studies organised by the partner companies.

GD study programme is first-cycle, whose students finish with geodetic, topographic and cartographic tasks using GIS technologies. Graduates of this first-cycle study programme can continue with the GISmf and ISGmf study programmes. These are second-cycle and aim to develop the ability y of solving engineering tasks and conducting research and data analysis. In GISmf and ISGmf, students get a wider knowledge of the technologies. According to the SER, afterwards, graduates can do a PhD.

(2) Expert judgement/indicator analysis

During the visit and the meetings with alumni, employers and social agents, it was confirmed that the aims and outcomes of the study programmes are in line with the needs of society and the labour market.

3.1.2. Evaluation of the conformity of the field and cycle study programme aims and outcomes with the mission, objectives of activities and strategy of the HEI

(1) Factual situation

The University Strategy 2021-2030 states that the university takes responsibility for developing new solutions to current global challenges. Therefore, the three study programmes are linked with this.

The GD study programme aim was updated to the Descriptor of Study Cycles (2016) and to the VI level of the National Qualifications Framework. The second-cycle study programmes were also updated to the VII level of the National Qualifications Frameworks in 2017. The GISmf is a joint programme with the RTU, which is also aligned with the RTU mission.

(2) Expert judgement/indicator analysis

Aims and outcomes of field study programmes are perfectly in line with the mission, objectives of activities and strategy of the Vilnius Gediminas Technical University.

3.1.3. Evaluation of the compliance of the field and cycle study programme with legal requirements

(1) Factual situation

The courses of the study programmes are interrelated general courses, study field courses, specializations, and electives courses. All of the courses follow the Requirements for the Development and Provision of Study Programmes approved by the university VILNIUS TECH.

The goals of the studies meet the EUR-ACE Standards and Guidelines for Accreditations of Engineering Programmes. Moreover, Lithuanian law is aligned with the European law, then, the studies which meet the requirements of the Lithuanian law, also do regarding European Union requirements.

In 2016 the goals of the studies were revised to follow the requirements for the specialists in the field and the ECTS minimum was applied for all the courses. The hours per week was also updated to the regulation. This includes, lectures, exercise, laboratories, auditorium hour and consultation with professor, this last is also available via Zoom since 2019.

Moreover, the content of the courses is checked every year by the professors, and each course has a card with detailed information about it that is available for the students, examples were provided as an annex.

The first-cycle study programme is 240 ECTS, which is 8 semesters being 30 ECTS per semester. This study changed the name in 2019, then it is the only Geodesy and Geoinformatics study programme in the country. In addition, in 2020 the content of the study programme was revised after the students review.

Table No. 1 Study programmes' Geodesy and Geoinformatics compliance to general requirements for *first cycle study programmes*

Criteria	General* legal requirements	In the Programmes
Scope of the programme in ECTS	180, 210 or 240 ECTS	240 ECTS
ECTS for the study field	No less than 120 ECTS	162 ECTS
ECTS for studies specified by university or optional studies	No more than 120 ECTS	78 ECTS
ECTS for internship	No less than 15 ECTS	18 ECTS
ECTS for final thesis (project)	No less than 15 ECTS	21 ECTS
Contact hours	No less than 20 % of learning	43,6%
Individual learning	No less than 30 % of learning	62,2%

The second-cycle study programme GISmf is 120 ECTS in four semesters. It is specialised in GIS. The study programme fulfils the General Requirements for Master's Study Programmes of Lithuania. This study programme was last updated during 2018 and 2021, it affected the evaluation methods, the recommended materials and the course content**.**

Table No. 2 Study programmes' Geodesy and cartography second-cycle compliance to general requirements for *second cycle study programmes*

Criteria	General* legal requirements	In the Programmes
Scope of the programme in ECTS	90 or 120 ECTS	120 ECTS
ECTS for the study field Information Services	No less than 60 ECTS	81 ECTS
ECTS for studies specified by university or optional studies	No more than 30 ECTS	30 ECTS

ECTS for final thesis (project)	No less than 30 ECTS	30 ECTS
Contact hours	No less than 10 % of learning	18,3%
Individual learning	No less than 50 % of learning	81 %

The ISGmf study programme was developed by the general requirements for the joint study programmes, in accordance to both universities. This is a 90 ECTS programme in 3 semesters, being one semester in VILNIUS TECH and the other in RTU, and the third one in one of them, giving the student the choice. This study programme was updated during 2018 and 2021, when some new courses were introduced as Real Estate and Cadastre, and some changes in the Master Thesis.

Table No. 3 Study programmes' Innovative Solutions in Geomatics second-cycle compliance to general requirements for *second cycle study programmes*

Criteria	**General* legal requirements**	**In the Programmes**
Scope of the programme in ECTS	90 or 120 ECTS	90 ECTS
ECTS for the study field Information Services	No less than 60 ECTS	45 ECTS
ECTS for studies specified by university or optional studies	No more than 30 ECTS	12 ECTS
ECTS for final thesis (project)	No less than 30 ECTS	30 ECTS
Contact hours	No less than 10 % of learning	19%
Individual learning	No less than 50 % of learning	76.8%

(2) Expert judgement/indicator analysis

The leaning outcomes of the study programmes is supervised by the Study Programme Committee and the Faculty Study Committee, the partners and students are also involved. The students are usually asked about the study programmes, also the graduates, employers, and associations. All the updates are notifying in the social networks.

During the visit, it was confirmed that the opinion of the companies is considered although it is done individually. The panel of experts believes it is convenient that there is a committee where the companies are integrated, and meetings are held with them.

3.1.4. Evaluation of compatibility of aims, learning outcomes, teaching/learning and assessment methods of the field and cycle study programmes

(1) Factual situation.

The information of the courses of each study programme are in the corresponding cards. This cards also include the methodology used in the course, which always is theory and practices using the latest materials. Some of these methods are regular lectures, presentations, discussions, group projects, case study analysis, testing, projects, problem-based learning, etc. The amount of time the students need varies according to the ECTS of the course.

The evaluation of the knowledge and performance of the student follows three steps presented in the course card, which is the amount of evaluation exercises and which they are, and also, what their weight is in the final grade. This card is introduced by the professor in the first day of course.

(2) Expert judgement/indicator analysis.

The meetings at the university confirmed that students are pleased with the teaching staff, learning outcomes and teaching/learning and assessment methods. Alumni also confirmed this.

3.1.5. Evaluation of the totality of the field and cycle study programme subjects/modules, which ensures consistent development of competences of students

(1) Factual situation

The GD first-cycle studies start with several courses of introduction to the study field, creating the base for the second-cycle studies (GISmf and ISGmf). In the second semester of GD studies there is an introductory practice with the participation of companies. There is another practice, training, in the fourth semester. The specialization courses are offered in the two last semesters, with them and the final thesis, students get to choose whether they want to specialise in Geodesy or Real Estate Cadastre.

The second-cycle studies, GISmf and ISGmf, start with the course on Research and Innovation, so by the end of the following semesters students can show their research work. In the second and third semester specialisation courses are also taught to help preparing the thesis. The study programme assures all the courses are interconnected and in a logical order.

(2) Expert judgement/indicator analysis.

In the meetings with the teaching staff and with the students, it is confirmed that there are no overlaps between the subjects and that there is good coordination between the teaching staff to ensure that the students acquire the competencies.

3.1.6. Evaluation of opportunities for students to personalise the structure of field study programmes according to their personal learning objectives and intended learning outcomes.

(1) Factual situation

GD offers two elective courses in the fourth and sixth semester, these courses are update every year. Moreover, the first and second semesters have elective language courses, and the third semester has alternative social science courses. In addition, students choose the area of their final thesis between Geodesy and Cartography or Real Estate Cadastre.

Regarding GISmf and ISGmf, in GISmf one elective course is offered in the third semester, also from an annually updated list of courses. In ISGmf two elective courses are offered in all the semesters. In addition, students can organise their studies according to their needs. And, after COVID-19, courses can be organised in remote or in blended mode.

(2) Expert judgement/indicator analysis

In the meetings with the students, it is confirmed that they can choose several elective subjects to personalise their study programme. There are two specialisations (Geodesy and Cartography or Real Estate Cadastre) in the first-cycle study programme.

3.1.7. Evaluation of compliance of final theses with the field and cycle requirements

(1) Factual situation

The final thesis is the research project of the student in the chosen area, which must show the skills related to the objectives of the study programme. Since 2021, there is a list of topics approved by the department, but also free topics can be chosen. From the approved topics only

one student can do each of them, and these topics cannot be offered more than three years. The thesis of the GD students depends on the specialisation area chosen in the sixth semester. The thesis is divided in three parts, the first one developed in the seventh semester and the two others during the eight semesters. All of them are evaluated, to assure a transparent assessment and high-quality projects.

The thesis of the GISmf students focuses on scientific problems and solutions. The master final thesis is prepared during the whole programme, and the evaluation is continuous by the supervisors. Regarding ISGmf, the topics of the thesis are chosen during the first semester in RTU, and the show it in the third semester at RTU or VILNIUS TECH. The evaluation is also continuous by the supervisors.

(2) Expert judgement/indicator analysis

The employers are part of the evaluation committee and in the meetings with the students and with the employers, it is certified that this is the case.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The aims, learning outcomes and content of courses are regularly reviewed.
2. The first-cycle study programme is the only one in Lithuania that prepares geodesy specialists in the Measurement Engineering study field.

(2) Weaknesses:

1. The ever-changing labour market requires analysis and review of programme courses followed by the introduction of new courses relevant to the labour market for the next years.

3.2. LINKS BETWEEN SCIENCE (ART) AND STUDIES

Links between science (art) and study activities shall be assessed in accordance with the following indicators:

3.2.1. Evaluation of the sufficiency of the science (applied science, art) activities implemented by the HEI for the field of research (art) related to the field of study

(1) Factual situation

According to the SER, the unit conducting scientific research in the field of geodesy and cadastre is the Institute of Geodesy. The Institute is a scientific unit of the Faculty of Environmental Engineering. The Institute conducts national scientific research and experimental development research used to create and improve the National Geodetic Back-up and the National Base of Vertical Geodesy. As well as European projects are being implemented with particular emphasis on the Baltic Sea basin and the European continent.

Since 2018, the Research Council of Lithuania conducts an annual evaluation of the institute's activities. The analyses presented in SER indicate that the area of research related to Measurement Engineering is very well assessed. The result of positive evaluations is, among others, the right to conduct doctoral studies.

The Department of Geodesy and Cadastre, together with the Institute of Geodesy, conducts research mainly in the field of Measurement Engineering and technical sciences. These are their main areas of scientific research, which are implemented through projects in the field of:

- Geodetic technologies,
- Geoinformation technologies,
- Construction of networks and their control.

The university cooperates with business and other research institutions jointly applying for funds for research, among others, from the European Strategic Fund. The effect of joint research projects is to provide students with places for professional practice and research materials for the implementation of diploma theses.

The results of research work are also the primary source of data for the creation of scientific publications of the faculty employees and their scientific development. Their involvement in the publishing area is included in the three-year research plans.

(2) Expert judgement/indicator analysis

The university has an established and important place among research institutions in Lithuania. Research works are financed from national and EU funds. The funds obtained are used to maintain and, if possible, expand the research potential (laboratory and human). The conducted

research areas were confirmed during talks at the university. And they are closely related to the assessed field of study.

3.2.2. Evaluation of the link between the content of studies and the latest developments in science, art and technology

(1) Factual situation

The competences of academic teachers resulting from conducted research works are used in the subjects they teach. This allows for continuous analysis of program content and its updating. Such activities allow for a proper balance between students' interests and teachers' knowledge. The result of students' interests are the topics of diploma theses and the implementation of projects during studies. In addition, a measurable effect of the research work is the use of the latest measuring equipment by students during practical classes.

(2) Expert judgement/indicator analysis

Students appreciate the possibility of extensive use of the knowledge and skills of academic teachers and the possibility of practical vocational training with the use of modern measuring equipment. The information contained in the SER was confirmed during a meeting with students during the visit of the expert panel at the university.

3.2.3. Evaluation of conditions for students to get involved in scientific (applied science, art) activities consistent with their study cycle

(1) Factual situation

According to information from the SER, the Department of Geodesy and Cadastre provides students with access to the results of research and development work. This causes student engagement to increase. Their practical skills increase and their theoretical knowledge expands. All this creates an increase in professional aspirations of graduates. Therefore, with the participation of funds obtained from the national authorities, jobs for students and graduates are created for the implementation of research. In addition, some students are directed to professional internships. The effects of student development resulting from additional (not included in the study programme) activities can be found in papers and articles presented at scientific conferences.

(2) Expert judgement/indicator analysis

Information about the greater involvement of students returning from professional practice and internships was confirmed during the meeting with students. In addition, students are satisfied with the possibility of combining studies with research works. Especially when professional work is closely connected with the field of study. Every year, several students are employed part-time at the faculty where they study. In this way, they can, by participating in the implementation of research work and update their knowledge acquired during their studies. Preparing scientific publications are preparing them for the next stage of their development, e. g. during doctoral studies.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. A well-developed system of student activation as part of research works

3.3. STUDENT ADMISSION AND SUPPORT

Student admission and support shall be evaluated according to the following indicators:

3.3.1. Evaluation of the suitability and publicity of student selection and admission criteria and process

(1) Factual situation

VILNIUS TECH has one *first cycle* study programme (*Geodesy and geoinformatics*) and two *second-cycle* study programmes (*Geodesy and Cartography* and *Innovative solutions in geomatics*) in Measurement Engineering field. Rules for admission are described in rules for admission of students to the *first* and *second* cycles approved by the VILNIUS TECH Rector's order, as well as the regulations of the national Centralised Admission Information System. In case of *first* cycle studies, competitive score calculation and information about additional scores are available on the VILNIUS TECH website. According to SER and on site-visit, 8, 4 and 9 students have been admitted to *first* cycle study programme and 4, 6 and 1 student admitted to Bridging courses and complementary studies in 2019-2021 accordingly. During 2019-2021 average competitive score to the *first* cycle studies were 5.71, 6.54 and 6.43 with higher scores in SF places in comparison with SNF places. According to on-site visit 18 students were admitted in 2022. In order to attract more students VILNIUS TECH organises various events and activities, participates at the annual fairs, presents study field at secondary schools and gymnasiums.

In case of *second* cycle studies, competitive score calculation and information about additional scores are available on the VILNIUS TECH website. According to SER and on-site visit, 16, 8 and 6 students have enrolled to *Geodesy and Cartography* study programme in 2019-2021 and 6, 2 and 7 students have enrolled to *Innovative Solutions in Geomatics* study programme. Unfortunately, number of applicants in 2020 was too low and study programme had a gap and in 2021 majority of enrolled students were from abroad and could not come to Lithuania because of pandemics resulting in only two students studying in the first year. Average competitive score to *Geodesy and Cartography* study programme had increased from 9.99 to 10.13 in 2019-2021 while competitive score to *Innovative Solutions in Geomatics* remained similar during all years (difference was approximately 0.2).

(2) Expert judgement/indicator analysis

In case of *first cycle* studies, declining demographic situation, increased minimal competitive score by Education ministry and lower Mathematics evaluation of the state school-leaving examination results have negative impact on admission. But since Ministry of Agriculture established the award of 200 Eur as an annual scholarship to the first-year students in 2021, number of admitted students increased to 18 in 2022. Nevertheless, VILNIUS TECH should have a concrete plan and a list of actions which would allow to attract more students for the future. In case of *second cycle* studies, declining demographic situation, unpopularity of technical professions, challenging studies and possibility to find the desired job after graduating from bachelor studies maybe reasons of decreased number of people applying to master's degree study programmes. Even though number of applicants was not large but competitive scores during 2019-2021 in both study programmes were high enough showing that motivated students choose these *second* cycle studies. VILNIUS TECH should improve promotion of *second* cycle study programmes and plan concrete measures that would help to secure a steady number of applicants in the future.

3.3.2. Evaluation of the procedure of recognition of foreign qualifications, partial studies and prior non-formal and informal learning and its application

(1) Factual situation

The information about process for recognition of foreign qualifications and partial studies is provided in the "Description of the procedure for recognising study results at Vilnius Gediminas Technical University" approved by Senate. Procedure of recognition of informally gained

achievements is described in the "Description of the Procedure for Assessment and Recognition of Informally and Individually Acquired Competences" approved by Senate also. All information can be found in VILNIUS TECH website and is easy to find.

(2) Expert judgement/indicator analysis

VILNIUS TECH has procedures that are described and published in VILNIUS TECH website. Students are informed that their previous experiences and achievements gained during partial studies or in non-formal way can be recognised. The procedures are adequate and correctly applied since the VILNIUS TECH has joint master's programme (*Innovative Solutions in Geomatics*).

3.3.3. Evaluation of conditions for ensuring academic mobility of students

(1) Factual information

The VILNIUS TECH Measurement Engineering students can choose from 49 universities within Erasmus+ programme. VILNIUS TECH students are provided with information about mobility opportunities by The University International Relations Office, Faculty of Environment Engineering International coordinator, head of the Department.

During 2018-2021 21 students of both *first* and *second* cycles have used academic mobility opportunities for internship or partial studies. Moreover, *Innovative Solutions in Geomatics* had 8 international students who were studying in the same group as national students.

(2) Expert judgement/indicator analysis

Students of Measurement Engineering field know about academic mobility opportunities and during on-site visit have claimed that they have had used this possibility or are considering to do so in the future. Since one of *second* cycle study programmes are joint degree study programme, students gain international experience while studying. Students have expressed that both administrative and teaching staff are encouraging them to use academic mobility possibilities.

3.3.4. Assessment of the suitability, adequacy and effectiveness of the academic, financial, social, psychological and personal support provided to the students of the field

(1) Factual situation

Information about academic, financial, social, psychological and personal support can be found on VILNIUS TECH website. A wide spectrum of scholarships is available for the VILNIUS TECH students according to Lithuanian laws and include incentives, support for disabled persons, and single scholarship to support active cultural, sports and other social activities on behalf of university. The Dean may award students from the Faculty of Environment Engineering fun due to the complicated financial situation, serious illness or loss/death of parents or guardians. Moreover, in the 2019 *Innovative Solutions in Geomatics* students at RTU were supported by European Union Structural Fund and since 2021 *first* cycle students were awarded scholarships by the Ministry of Agriculture.

Students are consulted by administration staff, the head of respective department, mentors and Student Representation which provides students with wide range of support and represents their interest. Moreover, VILNIUS TECH proposes seminars, discussions and lectures on psychological education, as well as consultations with VILNIUS TECH psychologist. Furthermore, VILNIUS TECH has Academic Support Centre which organises provides consultations and other kind of support for students about their career choice, internships, job search issues and other related topics.

(2) Expert judgement/indicator analysis

The panel judges that students' academic, financial, social support is adequate and suitable. During on-site visit students claimed that they know what help they can receive and where to look for it. Students expressed that since there is relatively small number of students, they can easily get support from each other as well as from administrative and teaching staff.

3.3.5 Evaluation of the sufficiency of study information and student counselling

(1) Factual situation

Student counselling starts from the first days at VILNIUS TECH within the programme "Introduction to speciality" and during first week when no lectures are held. Consultations are provided by their tutors, academic staff members, mentors and Student Representation.
Moreover, students can get additional consultations from teaching staff every week.

Students are involved in study process through Student Representation, filling surveys after every semester and by directly communicating with teaching staff. Students' representatives

participate in the activities of the study committee, cooperates with students' organisations of other educational institutions, organises student surveys and meetings, discussions, conferences.

(2) Expert judgement/indicator analysis

During on-site visit students expressed that counselling is sufficient and there is no deficiency of study information dissemination. Students also expressed that they are grateful for teachers who tend to always give needed help and answer their questions effectively. They also emphasised that all issues related to study process can be resolved fast by talking with teaching and administrative staff since they are small group and usually know each other which makes all communication efficient.

Nonetheless according to on-site visits, number of students in later years is sometimes more than 2 times lower than in the first year. VILNIUS TECH should pay attention to this situation and look for reasons why students do not graduate this programme in time and search for possible solutions.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Strong institution of Students Representation.
2. The number of students admitted to *first* cycle studies increased significantly in 2022.
3. High quality academic, financial, social, psychological and personal support.
4. Effective and continuous communication between teaching staff and students.

(2) Weaknesses:

1. Small numbers of students in the last years of studies in *first* cycle study programme.
2. Decreasing number of students enrolled into *second* cycle study programmes.

3.4. TEACHING AND LEARNING, STUDENT PERFORMANCE AND GRADUATE EMPLOYMENT

Studying, student performance and graduate employment shall be evaluated according to the following indicators:

3.4.1. Evaluation of the teaching and learning process that enables to take into account the needs of the students and enable them to achieve the intended learning outcomes

(1) Factual situation

The Study Programme Committee (SPC) is responsible for the supervision and implementation of the study programme. The SPC reviews the study programmes each academic year and submits the proposed amendments to the Department and the Faculty Study Committee.

There is very little information about students need and how students' needs were implemented/amended to the studies.

(2) Expert judgement/indicator analysis

Information from students must be collected and evaluated/ implemented in SPC.

3.4.2. Evaluation of conditions ensuring access to study for socially vulnerable groups and students with special needs

(1) Factual situation

The University campus is fully adapted for students with movement disabilities. Faculty applies a flexible schedule of assessment/exams for students with a disability, considering their needs and level of disability. In cases of severe disability, students are partially or entirely exempt from tuition fees.

Special software and hardware, specialized furniture and various equipment for students with disabilities, which helps create working areas for students with disabilities at the University.

(2) Expert judgement/indicator analysis

The University is in line with requirements for students from socially vulnerable groups and students with special needs

3.4.3. Evaluation of the systematic nature of the monitoring of student study progress and feedback to students to promote self-assessment and subsequent planning of study progress

(1) Factual situation

A Committee of the University, Faculty or the Study Programme monitors the study progress at the university. Monitoring system fully implemented. Data collected and evaluated during different procedures.

(2) Expert judgement/indicator analysis

Monitoring system implemented and work on regular base. Students and teachers use it regularly.

3.4.4. Evaluation of employability of graduates and graduate career tracking in the study field

(1) Factual situation

The employment and career of graduates are monitored through surveys. Data collected and well used. Survey made every year. University has wide range of social partners.

(2) Expert judgement/indicator analysis

Monitoring of careers of graduates is implemented but contact with good contacts with social partners.

3.4.5. Evaluation of the implementation of policies to ensure academic integrity, tolerance and non-discrimination

(1) Factual situation

University academic staff, students and free movers/ listeners follow the principles of academic integrity defined in the Code of Academic Ethics of Vilnius Gediminas Technical University.

3.4.6. Evaluation of the effectiveness of the application of procedures for the submission and examination of appeals and complaints regarding the study process within the field studies

(1) Factual situation

The received appeal or complaint procedures well described and implemented. Formal bodies established.

In the period 2019-2021, no complaints were received regarding the study process.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Strong institutional organization.
2. High quality academic, financial, social, psychological and personal support.

(2) Weaknesses:

1. Small numbers of students and weak cooperation with market/social partners.

3.5. TEACHING STAFF

Study field teaching staff shall be evaluated in accordance with the following indicators:

3.5.1. Evaluation of the adequacy of the number, qualification and competence (scientific, didactic, professional) of teaching staff within a field study programme(s) at the HEI in order to achieve the learning outcomes

(1) Factual situation

As stated in the SER, the list of courses and the research interest in the field shows the close relationship between the academic staff's scientific and teaching activities.

The Annexes 1.1-1.3 show the staff's taught courses and the figures 5.1 and 5.2 show their practical experience. In addition, two emeritus professors continue working within the programmes: they consult students and staff and have co-authorship in scientific publications The academic staff teaching in master 's degree programmes GISmf and ISGmf have 20 years of scientific experience.

As can be seen in the SER, the academic staff dedicated to teaching measurement engineering curricula has extensive pedagogical and scientific experience.

The number of students was decreasing in the last years and this is due there is less interest in STEM (science, technology, engineering, maths) studies and professions in Lithuania and many countries. To improve the situation, VILNIUS TECH organises various activities for school students: Olympiads, conferences, lectures, and laboratory works, and it helps the schools implement the project Branda (Maturity, Eng.). For other hand, this facilitates a better staff – students' ratio and helps their better learning. Despite this, engineering studies should be promoted and efforts should be made to attract more students.

The academic staff dedicated to teaching Measurement Engineering curricula has extensive pedagogical and scientific experience and the students have more time for direct contact with the academic staff. The education has recently been individual-based, and student consultations have become longer due to the higher staff –students' ratio.

(2) Expert judgement/indicator analysis.

The academic staff is sufficient and participates in research projects and expert evaluations and provides scientific consultations that help in the improvement of their teaching as has been proven in the meetings held with employers, social partners and in the meeting with them.

3.5.2. Evaluation of conditions for ensuring teaching staffs' academic mobility (not applicable to studies carried out by HEIs operating under the conditions of exile)

(1) Factual situation

On 5 March 2019, Senate resolution 57-1.1 approved the description, which provides the award of scores for academic staff for teaching visits in foreign universities and the provided certificates for participation in studies related seminars.

To helping the teaching staff, in VILNIUS TECH there is the International Relations Office (IRO), that promotes teaching or training visits abroad, or participates in conferences and project applications.

From the information provided in the SER it comes out, 24% of the total academic staff have carried out Erasmus stays in Lithuanian universities and in the rest of Europe.

(2) Expert judgement/indicator analysis

In the meeting held with the teaching staff, the experts panel stressed that it is important to make stays in other universities and the staff admitted that it is an experience that should be increased.

3.5.3. Evaluation of the conditions to improve the competences of the teaching staff

(1) Factual situation

In the last 3 years, the academic staff who teach in the first and second cycle study programmes in the field of Measurement Engineering have participated in 86 different seminars organized by ECG in accordance with the SER.

Annex 5.6 shows the seminars and it is observed that in the 19-20 academic year they participated in 24 seminars of 113 hours and the following year in 45 seminars with a total of 144 hours.

An increase in participation in the professional development process shows that the teaching staff is striving to improve the quality of studies.

The teaching staff is motivated to improve their knowledge of the English language. The university organizes partially subsidized English training courses several times each academic year.

The academic staff of the Department of Geodesy and Cadastre actively participate in training and research production has increased.

(2) Expert judgement/indicator analysis.
The conditions to improve the competences of the teaching staff are aligned with the needs of the teaching staff and the university is concerned that the teachers use them.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The academic staff dedicated to teaching Measurement Engineering curricula has extensive pedagogical and scientific experience.
2. There is higher staff –students' ratio and improve the learning of students.

(2) Weaknesses:

1. Engineering studies should be promoted and efforts should be made to attract more students.
2. Erasmus teaching staff mobility should be increased.

3.6. LEARNING FACILITIES AND RESOURSES

Study field learning facilities and resources should be evaluated according to the following criteria:

3.6.1. Evaluation of the suitability and adequacy of the physical, informational and financial resources of the field studies to ensure an effective learning process

(1) Factual situation

According to the information provided by the SER the auditoriums, laboratories and computer rooms (equipped with all the necessary licensed software) are adequate in number, size and quality and fully meet the study requirements.

The SER shows GKK's own specialized technical team and comments that the state-of-the-art equipment is provided by the university social partner –UAB GeoNovus.

Both the software and the hardware detailed in the report are current and more than sufficient for students to acquire the expected learning results.

According to the SER, around 120,000 Eur per year are allocated for the renewal of the software licenses used. According to 2020 data, the university has upgraded 26.2% computer jobs in computer science classes.

Through the project "Development of the computer network of Lithuanian higher education institutions" financed by the Structural Funds of the European Union has supported all introductory bus network equipment in all buildings have been replaced.

The university has ramps, lifts and toilets adapted for people with reduced mobility.

The laboratories are equipped with special supports to work with geodetic instruments in bad weather conditions, and in summer, the tasks are carried out in the open air near the university. The university makes available to students the use of the central library of VILNIUS TECH, which is among the most modern libraries in Lithuania, and the subsidiary libraries of the faculties. The library provides access to more than 398,000 e-books, standards, and more than 26,000 e-journal titles.

The project of the State Studies Foundation “Ensuring Accessibility of Studies for Students with Special Needs” supported the provision of four workstations for students with disabilities in the university library.

(2) Expert judgement/indicator analysis

During the site visit, the adequacy and suitability of the physical, computer and financial resources of the field studies to ensure an effective learning process was verified. The university has ramps, lifts and toilets adapted for people with reduced mobility.

3.6.2. Evaluation of the planning and upgrading of resources needed to carry out the field studies

(1) Factual situation

The Department prepares an annual plan and allocates a budget for the purchase of the necessary equipment. Part of this budget is built with the help of research work and contracts carried out by the Department and the Institute of Geodesy.

As mentioned in the SER, the centralized funds for laboratory equipment are decreasing every year, considering the decrease in the number of students enrolled.

(2) Expert judgement/indicator analysis

It is necessary to obtain funds from social partners in order to be able to update the laboratories in the next years and to carry out actions to increase the number of students.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The facilities and learning resources are adequate in number, size and quality and fully meet the study requirements.

(2) Weaknesses:

1. It is necessary to attract more financial support from social partners for the renewal of laboratories and equipment.
2. To carry out actions to increase the number of students is necessary.

3.7. STUDY QUALITY MANAGEMENT AND PUBLIC INFORMATION

Study quality management and publicity shall be evaluated according to the following indicators:

3.7.1. Evaluation of the effectiveness of the internal quality assurance system of the studies

(1) Factual situation

Vilnius Gediminas Technical University has procedures for implementing, improving and ensuring the quality of education at the level of the University and Faculties. At the university level, the Rector, the Senate and the University Study Program Committee are responsible for implementing the procedures. At the faculty level, the Dean, the Faculty Council and the Faculty Study Committee are responsible for the implementation of procedures.

There is no information in the SER on the frequency of reviewing the quality assessment procedures at the university, which is why a question was asked on this matter. In addition, they were asked to explain what the procedure for improving quality procedures looks like if necessary. During the site visit, answers to the questions asked were received, which supplemented the knowledge from the SER. The management of a quality system generally resembles the organization of quality management in European Universities.

(2) Expert judgement/indicator analysis

Quality procedures at the university are ensuring the quality of the university's operation in every aspect of its activity. The meetings at the university confirmed that students and employees as well as the university administration know the quality procedures and know how to use them. However, the experts panel believes that the number of documents describing the quality system at the University should be optimized and reduced.

3.7.2. Evaluation of the effectiveness of the involvement of stakeholders (students and other stakeholders) in internal quality assurance

(1) Factual situation

The SER shows that external stakeholders are involved in the process of practical training of students. In addition, they take part in the preparation of diploma's thesis topics. Representatives of employers, as representatives of three faculty committees appointed in accordance with the university's legal documents, are involved in the process of improving study programmes. Students are involved in the process of evaluation of the field of study by participating in the work of the Faculty Council and faculty committees. In addition, they provide their grades in questionnaires that are completed after the end of the cycle of classes within the field of study and after completing professional practice. The teaching staff has an impact on the education quality process by participating in the work of the Faculty Council, relevant faculty committees

and through the evaluation survey. They also express their opinions at faculty meetings, update curricula and teaching materials.

(2) Expert judgement/indicator analysis

Internal stakeholders are involved in the process of maintaining the quality of studies. Teachers, as part of their professional duties, improve study programmes and adapt the teaching environment. Students take part in surveys. However, the involvement of external partners (external stakeholders) is too dispersed, perhaps it would be good to create, for example, a business council that could give a synthetic picture of the needs of the labour market.

3.7.3. Evaluation of the collection, use and publication of information on studies, their evaluation and improvement processes and outcomes

(1) Factual situation

The SER states that a few information is collected in the university's IT system. These are data related to the offer of studies, study programs, schedules, records of diplomas, information about students and other sensitive personal data. It is not specified exactly what types of documents are published on the university's website and which, due to their confidential nature, are only available for inspection by authorized persons. The analysis of the website shows that only the study offers, and study programmes are available in the open mode. After the completion of the study cycle, the content of the study programme is verified and, if necessary, corrected by the Study Programme Committee and the Faculty Study Committee with the participation of external stakeholders. The results of evaluation of study programmes are communicated to all interested parties (students, teaching staff and external stakeholders).

(2) Expert judgement/indicator analysis

During the meetings, the experts panel was convinced that access to sensitive data is only for authorized persons in the internal IT system. However, information on timetables should also be available on the university's website.

3.7.4. Evaluation of the opinion of the field students (collected in the ways and by the means chosen by the SKVC or the HEI) about the quality of the studies at the HEI

(1) Factual situation

The university has a feedback system that monitors the quality of the teaching process at the university. The system is based on student surveys, which are completed in three study periods: during the first year of study (applies to first-cycle studies) to find out the reasons for starting studies at HEI, after each semester (applies to first- and second-cycle studies) to find out opinions during studies, in the first year of second-cycle studies to learn about the quality of first-cycle studies. The survey in the form of a test is available in the university's IT system. The results of the survey analyses are discussed by the managing bodies of the university and the faculty. They are also available to teachers. Surveys have a real impact on the assessment of the teacher's work and, by definition, improve the performance of classes. In extreme cases, surveys have an impact on further employment of a teacher.

(2) Expert judgement/indicator analysis

The university has a feedback system that monitors the quality of studies. Information is obtained from various internal and external stakeholders. The information obtained by the team of experts from the Self Evaluation Report and during the meetings indicate that the system for monitoring the quality of studies works well.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Quality procedures work properly.

(2) Weaknesses:

1. Cooperation with external partners can be improved in order to obtain synthetic knowledge about the needs of the labour market.
2. Number of documents describing the quality system at the University should be optimized and reduced.

IV. RECOMMENDATIONS

Evaluation Area	Recommendations for the Evaluation Area (study cycle)
Intended and achieved learning outcomes and curriculum	N/A
Links between science (art) and studies	N/A
Student admission and support	VILNIUS TECH should find out whether small numbers of students in last years of studies are single cases or tendencies. Moreover, reasons for not graduating in time should be ascertained and accordingly to that certain specific action plan should be conducted. Second cycle study programmes tend to attract less students. VILNIUS TECH should plan concrete measurements that will be used in order to have more applicants and more students enrolled.
Teaching and learning, student performance and graduate employment	University needs to involve more social partners and study detail needs from market. The number of students need to be increased.
Teaching staff	To carry out actions to increase the number of students is necessary. Erasmus teaching staff mobility should be increased.
Learning facilities and resources	Should attract more financial support from social partners for the renewal of laboratories and equipment.
Study quality management and public information	Develop ways to obtain information from external stakeholders. Reduce the number of documents describing the quality system at the university.

V. SUMMARY

VILNIUS TECH is a state-owned university with a well-established position in Lithuanian higher education system. Academic staff makes major contributions in their fields of research works. Therefore, position of VGTV in research world is growing.

The experts panel would like to thank you very much for the professionally prepared Self Evaluation Report, which helped a lot in preparing the External Evaluation Report.

The experts panel noted, from the interview with the students, that they are proud of being part of the University. They appreciate the close contact to their teachers. They also appreciate the many forms of support offered to them. The experts panel had a very positive impression of the connections and relationships that the faculty has developed with social partners, academic institutions, and employers, who expressed their satisfaction with the qualifications that graduates obtained during their studies.

The experts panel positively evaluates: a well-developed system of student activation as part of research works which should be further expanded, operation of the study quality management system. It is commendable that in 2022 number of students admitted to *first* cycle studies increases significantly thus VILNIUS TECH should keep this tendency in the future years as well as plan measures to attract more students to *second* cycle studies.

The suggestions for improvement made in this report partly refer to: creation of one committee at the faculty under which various external partners worked out common synthetic proposals for changes in study programs.

Students have claimed that they receive high quality support and have close contact with teaching and administrative staff. Nevertheless, low number of students in the last years of *first* cycle is a concern which should be paid more attention.

The only major point of concern the expert team identified is small number of students in the evaluated field of study. The experts panel proposes to increase the activity of the university during the recruitment period.

At the end experts panel would like to thank all staff, students, social partners and administration staff involved in evaluation and took part in our meetings for their commitment and help during site visit. We wish to assure all concerned that we have made every effort to scrupulously analyze the evidence presented to us and have thoroughly discussed and considered our recommendations.

Expert panel chairperson signature:	**Prof. dr Krzysztof Czaplewski**
(signature)	