CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

EVALUATION REPORT

STUDY FIELD of NATURAL RESOURCE TECHNOLOGY

at Vytautas Magnus University

Expert panel:

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Study Field Data*

Title of the study programme	***Industrial ecology***
State code	6211FX 001
Type of studies	University studies, master
Cycle of studies	Second
Mode of study and duration (in years)	Full time (2 years)
Credit volume	120
Qualification degree and (or) professional qualification	Master of Technology Sciences
Language of instruction	Lithuanian , English
Minimum education required	Bachelor's degree
Registration date of the study programme	2017-01-25

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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 the 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 September 28, 2023.

Assoc. Prof. dr. Iveta Šteinberga (panel chairperson) *Director of Environmental Masters study programme of Faculty of Geography and Earth Sciences University of Latvia, Riga, Latvia;*

Prof. Dr. Abdeltif Amrane *Professor at the University of Rennes and Director of the University Institute of Technology of Rennes, France;*

Prof. Dr. Kęstutis Arbačiauskas *Chief Researcher, Head of Laboratory of Evolutionary Ecology of Hydrobionts, Nature Research Centre and Professor, Life Sciences Center, Vilnius University. Vilnius, Lithuania;*

Ms Ernesta Varapnickaitė *BSc graduate in Building Energetics (Vilnius TECH), MSc student in Environmental protection management and technologies (Vilnius TECH).*

1.3. GENERAL INFORMATION

The documentation submitted by the HEI follows the outline recommended by SKVC. Along with the SER 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 courses descriptions
2.	Package of final thesis

1.4. BACKGROUND OF NATURAL RESOURCE TECHNOLOGY STUDY FIELD INDUSTRIAL ECOLOGY STUDY PROGRAMME AT VYTAUTAS MAGNUS UNIVERSITY

The need for specialists in industrial ecology is both local and global. This need is determined by several initiatives related to sustainable development - planned development of Lithuania in line with the UN Sustainable Development Goals, Green Deal, the role of industrialisation in the economy, climate-neutral economy, etc.

Implementing all these initiatives requires qualified specialists in public and administrative institutions, private companies and non-governmental organisations. The Industrial Ecology Study Programme offers the preparation of such specialists, providing multidisciplinary specialists with innovative thinking and the ability to transfer professional activities and scientific development.

Vytautas Magnus University was founded in 1922 and re-established in 1989. It is a classic university whose values include freedom, openness, dialogue and its focus on cultural development. The university offers humanities, social, fundamental, environmental, biotechnology, technology and engineering studies at all three levels (Bachelor, Master and PhD). The university has 14 institutions - faculties and scientific research institutes. The acquisition of an industrial Ecology Master's study programme has been available since 2017. Among other similar Master's programmes in Lithuania, this industrial Ecology study program is the only one offering sustainable extraction of materials and energy aspects of technological processes. The study programme is dynamic, and its content is adaptive and changes with the current developments of the specific field, changes in legislation and policy. The study programme is realised in cooperation with other faculties and scientific institutions (for example, Lithuanian Research Centre for Agriculture and Forestry; Institute of Hydraulic Engineering; Faculty of Engineering), local and international social partners (for example, water treatment technologies company "Ekotakas", the Latvian Environment, Geology and Meteorology Centre and others).

II. GENERAL ASSESSMENT

The *second cycle* of *Natural Resource Technology* study field at Vytautas Magnus University is given **a 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	3
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Study quality management and public information	4
	Total:	**26**

*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. AIMS, LEARNING OUTCOMES, AND CURRICULUM

Aims, learning outcomes, and curriculum are evaluated according to 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)

As mentioned in the SER, the MSc program Industrial ecology prepares graduates to develop sustainable solutions that balance environmental, health, business and social interests, which is in line with Europe's new growth strategy and with the Lithuanian agenda which promotes better environmental performance. The development of the green economy sector shows the increasing demand for specialists, who can apply their professional knowledge to the needs of the state, society, and business, thus mediating between public institutions, private companies and non-governmental organisations, contributing to the development of sustainable, environmentally friendly and smart society.

There are three other Master's study programs in Lithuanian universities that can be linked to the Industrial Ecology. Among them, the closest is the KTU's Sustainable Management and Production study program, which aims to assess environmental impact. It should be noted that among other MSC study programs offered in Lithuania, only the Industrial Ecology focuses on the sustainable use of raw materials and energy in technological processes. Another specificity of this program is that it provides knowledge on how to achieve environmentally friendly solutions using not only engineering but also social tools.

Compared to similar programs conducted at foreign universities (i.e., universities of Chalmers and Leiden), no significant differences from the study program “Industrial Ecology” conducted at VMU were found, showing that the VMU program is in line with the general trends of the European universities. The difference is that foreign study programs focus more on social tools and are more general; while the relationship between industry and the environment is a unique feature of Industrial Ecology that is not reflected in other study programs.

Analysing this part of the SER gives nice introduction but somewhat too long, since it consists of almost five pages, which mainly give general information regarding General ecology; while the first mention of the MSc programme Industrial ecology appears only at page four of this subchapter.

Overall, new specialists who have completed their Industrial Ecology study program are needed in the labour market and there are a lot of job possibilities. Also labour market forecasts concerning circular economy experts are promising, there is a big labour market potential.

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

From the initial program developed in the frame of the strategy 2012-2020, the Industrial Ecology study program was reviewed and changed according to the new University's strategy. It is in line with the University's strategy, and especially with the "Studies 360o", and the following features can be highlighted:

- Multidisciplinary (strategic task 3.2)
- Opportunities to choose a field of practical activity and research (linked to strategic task 3.2.1)
- Develops the ability to research and find out the opportunities to create harmony between the natural environment and industrial activities (linked to strategic task 5.3.3)
- Develops student engagement in research activities by increasing synergies between studies and science (linked to strategic task 3.1.4).
- Develops the ability to present environmentally friendly solutions to society (linked to strategic task 5.4.2)

The conformity of the field and cycle study programme aims and outcomes with the mission, objectives of activities and strategy of the HEI is analysed in this subchapter, showing that they are in line with "Studies 360°", which is the key study-related part in the University's strategy. For instance, regarding the synergy between studies and science, according to the titles of the Master's theses presented in Annex 4, it can be seen that they are linked to experimental research in scientific laboratories where the teachers of the study programme work. In addition, the coherence between the intended learning outcomes of the program and the corresponding study courses is described in the Annex 2, in terms of (i) knowledge and its application, (ii) research skills, and (iii) special, social and personal abilities; the objective is to develop the ability to present environmentally friendly solutions to the society.

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

The aim, learning outcomes and composition of the study program were harmonised according to the fields of Technologies' descriptor, valid during the preparation of the report (until March 2, 2023). The compatibility of the program with the new version of descriptor has been reviewed and ensured no later than by September 1, 2023.

Table No.1. Industrial Ecology study programme compliance to general requirements for *second cycle study programmes (master)*

Criteria	General legal requirements	In the Programme
Scope of the programme in ECTS	90 or 120 ECTS	120 ECTS
ECTS for the study field Information Services	No less than 60 ECTS	108 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	31.9%
Individual learning	No less than 50 % of learning	88.1%

It is specified that the analysed study program meets the requirements of the Descriptor of Study Cycles in terms of the program aim and learning outcomes and some examples are given for the fields of technology. In addition, in terms of composition, the program in the study field of natural resource technology fully matches the requirements of VMU Study regulations.

In the second cycle, the students' workload includes their time in classes, laboratories, internship placements, making individual or group assignments, preparation for assessments, etc. In full-time studies, one year of 60 ECTS corresponds to 1600 student work hours, which includes significant individual work. As expected, the share of contact hours in master cycle programs is less than in bachelor cycle. The calculation of student workload and ECTS allocation is systematically revised, with an evaluation each semester.

There is obviously a high compliance of the field and cycle study programme with the legal requirements. There is only some minor comment: ECTS for the final thesis project is at the minimum level of (30). Indeed, it corresponds to one semester and hence a quarter of the two years of study; however, project thesis is an important part of a master, in terms of students' maturity, autonomy and hence is it the most appropriate amount of ECTS for this part of the formation. The amount of individual students' work corresponds to more than 60% of the total hours of work; however, nothing is said about how the time spent by the students in individual work is assessed.

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

The learning outcomes of the study courses are compatible with the learning outcomes of the study program; this coherence is shown in Annex 2 "Coherence between program aim, learning outcomes and program courses", in terms of (i) knowledge and its application, (ii) research skills, (iii) special, social and personal abilities. An example of description of study course is given in Annex 3, in which aims, learning outcomes, teaching/learning methods and assessment methods of a given study course are well detailed. Moreover, to help the reader, an example of the coherence between program's outcomes, course outcomes and learning, and assessment methods is presented in Table 1.2 of the SER; the chosen example concerns the program course "Risk assessment and reduction", showing the coherence of the "Industrial Ecology" study program with this program.

The list of learning outcomes and study program itself is periodically updated and upgraded according to national and EU regulation, international policy, needs of society and labour market. Moreover and according to the VMU Study Regulations, the learning outcomes are also periodically reviewed by the Study Program Committee. "Periodically" is too qualitative, quantitative indicators must be given. For instance, the periodicity of the review, update and upgrade of the learning outcomes and study program must be specified.

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

The study plan of the second cycle study programme Industrial Ecology is given in SER Annex 1. It seems consistent and covers a wide range of skills. It consists of study field courses, one research project and final thesis covering in total 120 credits, which are obtained after four semesters.

In addition to the compulsory study courses, elective study courses are also open to the students in the first and third semester. Practical works are usually team based, and the individual research starts with theory-based Research project" during the 3rd semester and continues during the "Master Thesis" (30 ECTS) in the 4th semester.

In this subchapter, the coherence of the development of the competences of students is discussed and illustrated with examples; this coherence is shown in terms of the covered scientific areas, in terms of the balance between theoretical and experimental skills, and in terms of social and personal abilities.

The balance between the contact work hours, lectures, seminars and laboratory work is given in Annex 1 and seems to be relevant. Indeed, for all study courses, lectures and laboratory work (or seminars) represents the same and significant amount of hours (contact work), 30 each. It is completed by 100 hours of independent work, which is relevant to develop students' autonomy.

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

The possibility to study according to an individual study schedule in order to meet specific learning needs is open and is regulated by the Description of Procedure for Submission of an Individual Study Schedule at VMU. Students can also take individual studies when creating their own individual study plans following *Artes Liberales* principles.
Students have also the opportunity to choose various foreign languages, more than 30 different languages are available.

The difference between an individual study schedule and the individual studies following the *Artes Liberales* principles seems not really clear. Indeed, the difference between an individual study schedule and an individual study plan has not been sufficiently clarified in the SER.

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

Preparation and defence of final theses are regulated by the VMU Study Regulations and General Order on the Preparation and Defence of the Final Theses, which are complete and clearly detailed. The rules are clear and usual. For example, the defence occurs at the end of the last semester and in case of a negative evaluation, the student has six months to re-defend his thesis.

During the analysed period, some final thesis were commissioned, which clearly meet the aim of the study program. The list of final theses is given for the period 2019-2022 in the SER Annex 4; however the number of theses is rather low, for instance only 3 in 2020, with a maximum of 8 for 2021. Upon reading the SER, it is not clear if the number of theses correspond to the number of students or there is more than one student on the same subject.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Graduates are prepared to develop sustainable solutions that balance environmental, health, business and social interests.
2. In Lithuania, only the Industrial Ecology MSc focuses on the sustainable use of raw materials and energy in technological processes.
3. The possibility to study according to an individual study schedule in order to meet specific learning needs.
4. The possibility of own individual study plans following *Artes Liberales* principles.

(2) Weaknesses:

1. The compatibility of the programme with the new version of Descriptor of the group of study fields of Technology needs to be updated.

3.2. LINKS BETWEEN SCIENCE (ART) AND STUDIES

Links between science (art) and study activities are evaluated according to 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

External evaluation of research and development (R&D) in the Technological Sciences of VMU is performed every three years; while internal evaluation is conducted each year. In addition, a Comparative Expert Assessment of R&D activities of Lithuanian Higher Education Institutions was conducted in 2018 based on the following criteria: 1) the quality of R&D activities, 2) the economic and social impact of R&D activities, and 3) development potential of the Unit of Assessment.

One of the strong points of VMU is to gather diverse research areas, namely the interdisciplinarity between humanities, social sciences, arts, natural science, and technology.
During the period of analysis, the number of full-time positions of researchers has increased from 3.2 (2019) to 5.3 (2022), which is a positive indicator. It would have been helpful to specify if they are permanent positions or not, even if the answer has been given during the site visit.
The Academic Staff of the second cycle study program Industrial ecology consists of 15 colleagues, which are mainly involved at half of their working time (Annex 5), since they are also involved in other faculties.

The time between two external evaluations seems to be relevant; while an internal evaluation each year seems to be relevant if this does not increase the workload too much for the teaching staff. Comparative Expert Assessment of R&D activities of Lithuanian Higher Education Institutions was conducted in 2018, which can be considered as too far to remain relevant.
Around 90% of the staff of the faculty receive additional payments for their scientific production. However, nothing is said about how it is realised and the amount paid. However it is relevant to motivate researchers, even if the financial sustainability of this system can appear difficult in some cases.

The balance between research and teaching for the staff is not clearly specified in the SER and the answers given during the site visit did not allow to get a clear overview regarding this question. It would have been therefore helpful to have more information regarding the working time that can be devoted to research by the staff members, as well as regarding the teaching load.

The Academic Staff consists of 15 teachers, mainly involved at half of their working time. Consequently in full working time, the staff is therefore only 9, which can appear quite limited.

The impact factor or the quartile of the three major works cited for each teacher is not always given. It is therefore difficult to assess the quality of all indicated documents, since they cover a wide range of scientific fields.

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

The content of the study program reflects the latest changes in the politics of understanding sustainability, the most relevant practical situations, and the latest scientific research achievements in implementing these solutions in practice. A close connection between study course content and scientific development is ensured in several ways, a) Regular updating of study course content, b) Innovative tasks for students, c) Correspondence of the course content with the EU and Lithuanian scientific and economic development priorities, d) Innovative, modern laboratory equipment and/or applied research methods, e) Excursions, meetings with specialists in the field of environmental research.

All courses are updated and modified before, at the end or during the semester. Examples related to recent events are given in the SER, such as the discussion of the Fukushima nuclear power plant accident discussed during related courses in Chemical and Physical pollution management. The close connection between study course content and scientific development is completed by a great care also given to the compliance of the courses with legal acts; it is especially needed and relevant for an Industrial Ecology program. All these shows the seriousness of the teaching team and reflects the quality of the training. However, care must be taken to avoid adding too much to the workload of the teaching staff.

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

At VMU, students of Industrial Ecology can be involved in scientific and applied activities in various ways, such as research projects, which can subsequently be the basis of their MSc thesis, and scientific conferences. Students are often involved in projects carried out by teachers of the program; they also have the opportunity to participate free of charge in scientific conferences organised by the University and can be co-authors of international conferences.

It is really relevant to help students to make the link between teaching and research and to choose their subject thesis. It is achieved through the participation of the students in projects and scientific conferences, allowing them to get an overview of the latest research developments.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. External evaluation is performed every three years; while internal evaluation each year.
2. All courses are updated and modified before, at the end or during the semester.
3. Close connection between study course content and scientific development.

4. Students' are involved in scientific and applied activities which help's to build their MSc thesis project.

(2) Weaknesses:

1. More care has to be given to the working time that can be devoted to research by the staff members.
2. More care has to be given to the teaching load.

3.3. STUDENT ADMISSION AND SUPPORT

Student admission and support are evaluated according to the following indicators:

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

Applicants to the Industrial ecology study programme are required to have a university bachelor's diploma in the study field groups of Life, Physical, Technological, Engineering, Agricultural, Education (qualification - biology teacher, chemistry teacher, computer science teacher, physics teacher, geography teacher, mathematics teacher, technology teacher) Sciences. Those who have obtained a university bachelor's degree or a professional bachelor's degree in other study field groups than specified, are required to have completed supplementary or minor studies in the study field groups of Life, Technological, Engineering, Agricultural sciences.

The numbers of applications and signed agreements for the second cycle study programme Industrial ecology in 2019-2022 vary from 7 to 9. The structure of admission scores is more-less traditional, giving a major weight to weighted average of the grades of all subjects in the bachelor's program. However, the scientific background of applicants is not evaluated. The promotion of studies is traditional, based on website publications, social networks, magazines and studies' fairs.

The admission system is well-developed and rationally adapted to the needs of undergraduates in the scale of Lithuania. It could be stated that during the evaluation period, there were no problems: it ensured a steady flow of new students. Especially the year 2022, when the study programme admitted the biggest number of students from the beginning of this study programme. Regarding the students' admission system, only one piece of advice could be noted: university master's studies are research oriented, therefore a composition of competitive scores should include the scientific background of applicants.

However, university and faculty management should take into consideration the possibility of attracting more students, such as foreign students - possibility to study the Industrial ecology in English is in progress and it is planned to adapt these studies for foreign students.

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

The learning achievements of a person who has studied at another Lithuanian or foreign higher education institution are recognised by converting the acquired evaluation into ECTS according to pre-agreed equivalents if there is no violation of the requirements of the contract or other document. The University possesses guidelines and protocols, as Vytautas Magnus University description of the procedure for academic recognition of competences and qualifications for validating foreign credentials, incomplete coursework, and prior non-formal and informal educational experiences. The criteria and regulations, informed by the contents of the self-assessment report, are deemed sufficient. Throughout the self-assessment period, students enrolled in the MSc second-cycle program in Industrial Ecology did not seek recognition for competencies gained through non-formal and informal means. Furthermore, from 2019 to 2022, there were no requests for the acknowledgment of student assessments from studies conducted at other universities.

Based on the information, that none of the students applied for the acknowledgment of student assessments from studies conducted at other universities it may be assumed that students who applied to other studies were highly sure about their choice. However, management should allocate greater focus to this aspect: acknowledging it as an opportunity for students to access education from other universities or study fields. By intensifying efforts to promote the recognition system, there is potential for increased application rates, as students become informed about this option and its associated advantages.

3.3.3. Evaluation of conditions for ensuring academic mobility of students

All VMU students are provided with opportunities to use Erasmus+ opportunities, to study for a semester or an academic year, to participate in Erasmus + internship lasting from 2 to 12 months, "Erasmus+" opportunity - short-term (from 5 to 30 days) study and practice mobility. However, none of the students used the opportunity for Erasmus+. During the visit management noted that the main reason for this drawback is a high percentage of working students. No full-time international students were enrolled in the Program during the self-assessment period. However, prior to the self-assessment period, some visiting students did participate in specific study courses within Industrial Ecology, such as the "Principles of Industrial Ecology and Sustainable Development" course. Additionally, during the meeting it was presented that management is looking for opportunities for double degree studies, that would be an attractive option for the students.

While VMU offers a comprehensive range of mobility opportunities and strives to raise awareness among its students, there are challenges specific to the Industrial Ecology program. The low participation in mobility programs by Industrial Ecology students may be attributed

to their employment commitments. The program should consider tailored strategies to encourage student engagement in mobility opportunities, taking into account their unique circumstances and needs. Additionally, efforts should be made to promote the program to international students to enhance its global appeal and foster diversity within the student body. However, most of the students stated that they would like to attend Erasmus+ studies, but the long-term studies abroad are the reason they are not using it, but if there would be any programs or practices for several weeks, they would use it. It could be concluded that students do not know about the possibility of "Erasmus+" opportunity - short-term (from 5 to 30 days) study and practice mobility.

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

University offers easily accessible and timely information on studies, university-related matters, and extracurricular activities, via various communication channels, including Moodle, student portal, university email, and website, to disseminate information. VMU demonstrates a commitment to inclusivity by providing support services for students with disabilities, encompassing academic and social aspects. VMU's Career Centre plays a crucial role in preparing students for their future careers, providing resources and opportunities for career development. Career planning seminars, consultations, and networking opportunities with alumni and social partners are planned and is described as one of the most important things for students.

Both, the self-evaluation report and students, state that academic support is very good. VMU offers comprehensive academic support to students in the Natural Resource Technology program, ensuring they have access to necessary information and regular interactions with teachers. The availability of information through various channels as VMU website, Faculty website, intranet and social media enhances students' preparedness and engagement in their studies. The regular meetings between students and program heads, as well as the presence of student representatives in decision-making bodies, promote a strong sense of collaboration and open communication within the program. However, neither students, nor alumni were able to clarify, if their suggestions after the meetings were implemented. In general, meetings revealed that students' representation in academic matters has to be improved.

VMU acknowledges the importance of students' psychological and spiritual well-being by offering counselling services and spiritual support, ensuring a holistic approach to student welfare. VMU's support system for students in the Natural Resource Technology program is comprehensive and effective, encompassing academic, financial, social, psychological, and career-related aspects. The university's commitment to inclusivity and student success is evident through its diverse support measures and active communication channels. These efforts collectively create a conducive environment for students' personal and academic growth. Conversely, there is a need for the management to pay greater attention to students'

representation, which is an integral aspect of academic support. Currently, students appear to play a passive role in receiving support, lacking the empowerment to influence academic procedures and the university's assistance provided to them.

3.3.5 Evaluation of the sufficiency of study information and student counselling

According to the self-evaluation report, the university employs various communication avenues, including personal emails, the intranet, study-related events, and the website. The administrative staff also offer personalised guidance on all study-related matters. Newly admitted students participate in special sessions with the faculty administration to gain deeper insights into the study procedures. Overall, students express that the university's communication methods are effective and ample, ensuring that announcements regarding the study processes consistently reach them without issues.

VMU ensures that students have access to individualised academic support through teacher consultations, fostering a conducive learning environment. Students mark out that communication with teachers is very easy, teachers are flexible and it is possible to get information when you need it. VMU adopts a multi-pronged approach to disseminate essential study-related information, catering to different preferences and ensuring students have access to comprehensive details about their courses and programs.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The university actively promotes student engagement in research activities and provides robust academic support.
2. During the period starting from 2019, the field successfully attracted students with notably competitive academic scores.

(2) Weaknesses:

1. There is no mobility of outgoing students.
2. Student`s representation in academic matters is insufficient, according to students and alumni.
3. Study field promotion could be improved in order to attract more students not only from VMU, but also from other universities.

3.4. TEACHING AND LEARNING, STUDENT PERFORMANCE AND GRADUATE EMPLOYMENT

Studying, student performance and graduate employment are 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

The full time study form of Industrial ecology includes various teaching methods – lectures, seminars, laboratory works. Lectures frequently include audio-visual materials with

subsequent analysis and discussion. They aim to provide fundamental and integrated understanding of the teaching field and give knowledge and skills aiming programme objectives. While practical training is mostly achieved by seminars using active study methods and laboratory works where students get skills and competence to use various equipment and analytical software. Teaching materials and methods are regularly reviewed and developed aiming to include contemporary achievements of the field and to correspond to the changing needs in the labour market. Learning abilities of the students are trained also by their individual and group work – analysis of literature sources, home-works, preparation of reports, presentations, etc. This learning activity of students is assessed and included into the cumulative score. As is the practice in the whole University, students are provided with necessary information also by the virtual learning environment and have good opportunities for distance studies. Students' ability to work in teams is developed by group assignments. Assessment of individual and group tasks is performed by lecturers who comment on their evaluation, and occasionally also collegial evaluation may be used. Students' performance is evaluated using cumulative grades typically consisting of final exam, mid-term tests and other individual or group assignments and their presentations. Described procedure of the learning process is aimed to achieve intended learning outcomes related to analysis, interpretation and special skills.

According to information provided in the self-evaluation report (SER), the teaching and learning process seems to be generally adequate for the students to achieve the intended learning outcomes.

The SER also states that upon graduation of the programme Industrial Ecology almost each year 1-2 graduates enter PhD studies, but that is not confirmed by information on employment of graduates.

During the visit, representatives of employers have indicated (according to their opinion) the high professional quality of the graduates from the Industrial Ecology program - broad thinking, capability to practically use acquired knowledge, and good basic skills to use scientific equipment. Also representatives of employers suggested more cooperation with trade organisations and expressed readiness to support students.

By the way, students have indicated that in the beginning of the program they lacked general information on the main purposes of the Industrial Ecology programme, but that seems to be recently improved.

Although teaching process seems to be sufficient to achieve intended learning outcomes, it can be advised to increase collaboration with other (than the university) scientific institutions in the preparation of students' master thesis. That may also include supervision of thesis preparation by scientists from outside the university. Such increased collaboration with scientific institutions may encourage students to choose the scientific career, and indeed enter PhD studies.

The graduates from the Industrial Ecology have good professional quality and are well prepared for the trade market, they have sufficient knowledge and are capable to apply acquired knowledge in practice. These capabilities, of course, may be further improved. For those, a closer cooperation with trade organisations and potential employers should be undertaken, and emerging new opportunities should be considered when improving the study program.

It seems that previously students did not receive sufficient general information about aims of the Industrial Ecology program, but that recently has been improved and students receive comprehensive information on the goals of the program they are going to study.

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

With respect to VMU disability policy (*University of Inclusive Opportunities*) socially vulnerable groups and students with special needs have adequate possibilities to study according to individual study plan, if required. Socially vulnerable groups may obtain various discounts for tuition or dormitory fees, also scholarships can be provided to such students. They are advised on various issues by a disability coordinator. Students with disabilities are provided various support – "are allowed to park their cars near the buildings, access to buildings is maintained, the necessary equipment is established for the disabled in libraries, classrooms are set with suitable furniture, students can settle in specially adapted dormitory rooms" (the SER, p. 42) .

During the assessment period, there was one student with special needs, and this person was provided with all necessary support.

The University has adequate and well organised provision for students from socially vulnerable groups and students with special needs. However, it could be advisable to provide proactive training and discussion to educate the community and to be prepared for potential challenges.

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

The SER states that the monitoring of student learning progress is governed by VMU Study Regulations and the Description of Procedure for Monitoring Study Progress and Providing Assistance to Students at VMU. The procedure has a clear process, which is described in detail in the SER (p. 42). It includes the following ways and stages: "1) The analysis of first year students' preparation for studies. 2) The analysis of students' registration to study courses. 3. The analysis of the reasons for the students' non-participation in interim and final examinations. 4) The analysis of students' intermediate and final evaluations. 5) The analysis of the data obtained from periodic surveys conducted at the University. and 6) The monitoring of students' learning progress, social integration and study experiences."

Students during their studies are provided with constant feedback concerning their study achievements, the intermediate and final evaluations are presented confidentially in the online system (http://studentas.vdu.lt). Study results may be discussed in the group or individually, and lecturers provide comments on evaluations of the study results. Teachers have weekly office hours intended to provide students with consultations on study issues. Communication may occur also through emails and Moodle. Constant supervision of the study process help students to follow their achievements as well as their learning shortcomings and offer ways for improvements.

It is obvious that the students' progress in the study field is adequately monitored, and students receive thorough feedback on their study results and ways to improve them. However, t sometimes students did not receive timely feedback on their inquiries concerning teaching and teaching results, and that definitely should be taken into account in the future.

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

The University has an active Alumni Club which maintains close relations with the University. It's members participate in the University events which are organized to enhance students' professional and employability skills as well as get acquainted with career opportunities. To ensure the quality of studies and to provide career planning service the employment and career of graduates are monitored. Graduates are asked to provide their opinion on how much they are satisfied with their current employment and what has been most useful while preparing for their career. All that information is used for further improvements of the study programme.

The SER states that employment of graduates of the programme reaches 90-100%, and most of them worked in highly qualified jobs. They are employed in state and public institutions (the Environmental Protection Agency, the Department of Environmental Protection, National Public Health Surveillance Laboratory, etc.), as well as in private companies (e.g. "Thermo Fisher Scientific Baltics", UAB "Dzūkijos vandenys", etc.). More than 60% of graduates work in highly qualified jobs as the chief specialist, ecologist, engineer, environmental specialist, etc.

Surveys of graduates suggest that the knowledge and skills acquired during the studies (74%) and those acquired by performing independent tasks (60%) were the most useful in preparation for the labour market. The rating of the contribution of studies to their preparation for the labour market, as assessed by graduates, is increasing.

Information on employment and careers of graduates is monitored and analysed. Several sources of information that provide feedback make it possible to see a more complete picture of the employability of graduates and their careers. This information also suggests that some graduates are not working in the field of their studies while reasons for that remain undisclosed. Generally, graduates from the Industrial Ecology program have sufficient professional background to successfully enter the job market, and their employment rate is indeed high.

It seems that the opinion of alumni concerning the study program is insufficiently considered, thus, it can be recommended to pay more attention to alumni's suggestions when further developing and improving the study program.

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

The principles of integrity are defined in the VMU Statute, the Code of Academic Ethics of VMU, VMU Study Regulations. Non-discrimination measures are regulated by the Code of Academic Ethics of VMU. VMU Gender Equality Plan for 2021-2025 promotes cultural and systematic change in University in order to maintain a balance of gender. VMU Provisions on Prevention of Plagiarism in Student Written Works identify types of plagiarism, methods of determining the plagiarism and consideration procedures, as well as recommendations for teachers and students on how to prevent plagiarism in written works. Brief procedures of the policy regulation are provided.

During the period under review, no cases of violation of the principles of academic integrity, tolerance and non-discrimination have been recorded in the study programme Industrial ecology.

Principles and processes of the policy for ensuring academic integrity, tolerance and non-discrimination implementation are well described. The provided documents and rules enable students and lecturers to know and act according to the established rules. On the other hand, a single acquaintance with the roles may not always ensure full compliance. Re-introduction through tests, videos may improve everyone's understanding and adherence.

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

Appeals and complaints regarding the study process are regulated by VMU Regulations for Submission of Appeals Regarding Evaluation of Learning Outcomes and/or Assessment Procedure until 2023, and currently these issues are solved according to VMU Regulations of the Dispute Resolution Commissions; the mentioned issues have also been determined by VMU Provisions on Prevention of Plagiarism in Student Written Works; and VMU Study Regulations. Students can submit an appeal regarding the assessment of learning achievements and the violation of assessment procedures. Possible decisions of the commission on the appeal and other actions are thoroughly described.

Within the period of this self-evaluation, there were no exclusions from examinations due to unfair events, as well as written appeals and complaints regarding assessment of learning achievements and violations of assessment procedures.

The procedures for the submission and examination of appeals and complaints regarding the study process is well described and can be considered as adequate. The involvement of representatives of students in the appeal examination may be important for the process and could be advised.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Well-functioning system for monitoring students' learning progress and good conditions for the study and integration of socially vulnerable groups and students with special needs.
2. Teaching is based on an innovative approach to personalized learning; methods to assess learning achievements are diverse and adequate to study methods.
3. Graduates from Industrial Ecology have good professional skills, are well prepared for the labour market and demonstrate high employment rate.

(2) Weaknesses:

1. Insufficient collaboration with scientific institutions outside the University in students' research work and absence of PhD students among graduates.
2. Insufficient collaboration with, alumni, social partners and potential employers in the process of study program improvement.
3. Not timely feedback on students' inquiries concerning teaching and teaching results, and insufficient involvement of students into the development of study program and teaching process.

3.5. TEACHING STAFF

Study field teaching staff are evaluated according to 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

According to the Self Evaluation Report, conflicting numbers were recognized, in the main text (SER, p. 48) it is stated that 20 teachers were involved, but in the Annex 5 - 15 lecturers are involved in the teaching. Main part of them were professors and assoc. professors. On average, full time teaching tools 1584 hours per year or 36 hours during the week, but these numbers strongly belong to the position, and work specifics according to the rules are split (contact hours, research, etc.). And it should be noted that all full-time teachers have at least B2 English language qualification, but only one person has full load (actually 1.5 load), it is recognized that in average workload for teachers is 0.5. During the face-to-face visit to the University, it was established that the workload indicated in the self-assessment report is pedagogical; the remaining workload is related to scientific activity. Qualification of academic staff, covering work quality, efficiency, productivity, is evaluated every five years.

Concerning scientific, pedagogical and practical work experience, the majority of teachers have at least 10 years of experience, which strongly relates to the course conducted within this study programme. Experience is also proven by local and international projects and publications

provided in SER Annex 5 and SER (Part 2), e.g. KLIMAGRO, FORCROPS, ENOUGH. Positively that project outcomes were incorporated in the study process.

The qualification of the academic staff is appropriate, the pedagogical workload of the studies is well balanced, and the possibility to practise scientific activity is ensured. The resources of the academic staff are sufficient to ensure the running of the study programme; high-skilled teachers (professors and associate professors) dominate with sufficient pedagogical and academic experience.

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)

About 50 % of teaching staff participate in different ways of mobility, either within Erasmus+ programme or training visits abroad, activity numbers vary from 1 to 6, exceptionally Covid-19 period with tremendous restrictions gave some problems within mobility that were solved by virtual mobility activities. During mobility, academic staff not only gain additional experience but also expand the professional networking network, continue to work on different levels of project applications and form consortia with partners inside and outside European countries. As another form of mobility, 60% of researchers take the opportunity to participate in international conferences (more than 130 conferences).

Concerning incoming mobility during 2019- 2022 within this study field 47 visiting lecturers came. For both, incoming and outgoing staff mobility has wide spatial variability, either from/to Europe, Asia etc.

Inbound and outbound mobility rates for academic staff are high. International cooperation partners, both in Europe and globally, provide such indicators. Various forms of mobility are actively implemented: ERASMUS +, cooperation in drafting project applications, and international conferences. Online mobility opportunities were used as an alternative solution, during COVID-19 restrictions. Outbound mobility involves most researchers and academic staff.

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

Qualification of the teaching staff is proven by grants and prestigious awards (e.g. Lithuanian Science Prize), active participation in international and national projects, and being a member in professional organisations. At least about 20 academic hours of professional, personal and general development was recommended for each teacher. These training were provided by VMU Professional Competence Development Centre, on average 8 trainings per month were conducted, more than 70 % of the teachers participated in online teaching and technology courses, more than 40 % in English language skills courses, and participation in European University Alliance activity were provided.

SER states (p. 53) that all full time teachers participated in various professional development activities. And, during the site visit (face-to-face interviews) it was recognized that the academic staff renewal plan was not invented.

Also, different local and international training and workshops were attended, and exchange of experience is practised among colleagues.

The competence and qualifications of the academic staff are consistent with the study programme's objective and sufficient to implement it. On the part of the university, extensive qualification development opportunities are offered, which academic staff actively use. Unfortunately, the renewal of academic staff is not systematically planned.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The competence and qualifications of academic staff are high and ensure achievement of study objectives.
2. A well-established and functioning system for the qualification improvement of academic staff.

(2) Weaknesses:

1. The academic staff renewal plan was not invented.

3.6. LEARNING FACILITIES AND RESOURCES

Study field learning facilities and resources are evaluated according to the following indicators:

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

Lectures and laboratory work of the study programme Industrial Ecology take place in large (up to 234 persons, 4 auditoriums) and small auditoriums (30-60 persons, 4 auditoriums), computer classes (13-22 persons, 5 auditoriums), and laboratories (10-15 persons, 10 laboratories). The rooms used for studies meet the requirements of occupational safety and hygiene standards. Ten specialised and well-equipped laboratories support the study process and research work of the students. The list of available equipment in laboratories is provided in the tables (133 positions, in total). Computer classes have adequate softwares. Students can also use laboratory equipment in other departments of the Faculty of Natural Sciences or even in other faculties. Experimental works in the fields of Experimentation station or greenhouses of Open Access Joint Research Centre of Agriculture and Forestry are also available. In addition to stationary equipment located in the laboratories, specific portable equipment for outdoor investigations and monitoring of environmental parameters is available. Such equipment is

important not only for teaching but is also used for investigation and preparation of the MSc theses.

It seems that available material resources completely satisfy the program needs, are sufficient for the current number of students and are suitable for achieving the intended learning outcomes. Interviews during the visit showed that laboratories are indeed very well equipped for teaching purposes of the study program.

All study facilities are adjusted for disabled people. In particular, all buildings contain elevators and lifts for the wheelchair of people with mobility disabilities; students with disabilities have access to parking close to study places; classrooms contain the necessary furniture; if required, the study process is organized according to the individual needs of students; etc.

Students and teachers are provided by a virtual learning environment and collaboration system Moodle which is regularly updated. There are good opportunities for distance learning.

The University library provides excellent user-friendly conditions for learning and research. It has good resources, including electronic material both in English and in Lithuanian. The library also has special equipment for various purposes, for example, software JAWS 14 for Windows, Win Taker Voice 1.6, Super Nova Magnifier, electronic Braille device ESYS 40, tactile printer and others. For the study and research, the 25 of VMU licensed databases, including Web of Science (Clarivate Analytics), are recommended and available for students from the Industrial Ecology program.

Students of the study programme Industrial Ecology have very good conditions for learning in auditoriums and training in laboratory classes. There is a sufficient number of working places for students of this programme. Laboratories are research oriented and quite well equipped. Safety in laboratories is well organised. The library is very well equipped, at all levels. Internet access is ensured. IT service is very good. To meet students requirements, library working time during sessions is extended.

Considering that Industrial Ecology is a master degree program, laboratories oriented to research provide for students good learning opportunities. Laboratories are individually supervised by lecturers-professors and by assistants, and that ensures a proper operation of available scientific equipment.

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

According to the SER, study resources are updated with respect to the annually prepared resource development plans submitted by the faculties and academies. VMU uses a centralized system for monitoring and updating hardware and software (about 20% of computers are renewed annually, computer network security systems are constantly updated), only legal software is used in computer classrooms and other computerized workplaces. Every six months, the software is audited and updated or supplemented.

Each year, the study programme committee prepares plans for the improvement of the infrastructure required for the studies. The needed resources and equipment are acquired from the available funds of the departments, new projects or targeted funding for the programme.

When planning the renewal of information resources relevant to studies, the necessary documents for study programmes are coordinated with the Library by lectures responsible for study programme courses.

The SER states that the infrastructure required for studies in the field of Industrial Ecology is suitable and sufficient, therefore there are no plans to fundamentally update the infrastructure in the near future.

The faculty which implements the Industrial Ecology program has sufficiently for teaching purposes equipped laboratories, and funding for the maintenance of laboratories is available. Some of those laboratories are shared between different faculties and different study fields and study programmes.

Upgrading of the laboratories is very much based on research funding. There is also funding from social partners and the state. However, the funding, as usual, is insufficient to purchase the newest and up-to-date scientific equipment. Participation in the international projects and more active participation in national projects would increase resources necessary for renewal of scientific equipment.

Annual renewal of computers at 20% means that computers last for 5 years, and can be considered as a bit too long for today's standards.

Generally, maintenance of laboratories is well organised and funding for that is available.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The study infrastructure is well-suitable for the implementation of the programme in Industrial Ecology.
2. Laboratories are well equipped and contain sufficient scientific equipment for a master degree studies and students' scientific research.
3. Library and IT services can be considered as excellent; information resources are appropriate and sufficient to achieve the expected learning outcomes.

(2) Weaknesses:

1. The lack of participation in the international research projects or networks that could support the up-to-date renewal and maintenance of scientific equipment in laboratories used for teaching and research.

3.7. STUDY QUALITY MANAGEMENT AND PUBLIC INFORMATION

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

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

The quality management system of studies includes targeted planning, implementation, evaluation and continuous improvement to achieve the objectives of higher education and to satisfy the requirements of employers in the preparation of new specialists. Main documents regulating this area were mentioned (e.g. VMU Statue, 2018; VMU Quality Manual, 2022; VMU Study Regulations, 2021; Procedure for Study Quality Assurance, 2022 etc.), also roles and responsibilities were shortly described. Main activities concerning study programme quality assurance were realised within the Study Programme Committee, where under evidence based analysis suggestions for improvements were prepared. All improvements were discussed between students, academic staff, social partners, etc. The Committee is composed of 11 members (9 academic staff, 1 social partner, 1 student) and recently most of the suggestions were related to specific study courses, ways of teaching.

Academic staff, whose responsibility is related to the introduction of newer research and didactic methods, transfer of international experience, and improvement of learning content, shall participate in the improvement of the quality process of studies. The social partner also contributes to including labour market requirements in the study programme. A student representative initiates the inclusion of news in the study programme following students' proposals. Unfortunately, graduates are not taking part in the process.

Cooperation tools and system to ensure quality management are in place and functioning. Cooperation and governance are fulfilled at different levels, from rector to academic staff, students and employers. The least involvement can be seen from graduates. The SER describes clearly understandable cooperation mechanisms. Collaboration with alumni could be improved.

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

Stakeholders in the internal quality assurance system were involved in different ways: collaborative way via discussions/meetings and systematic surveys, practical projects and joint research activities in order to prove preparedness for the labour market. Specifically, a survey of alumni on their adaptation in the labour market and career is conducted 12 months after graduation. And positively, also a survey for academic staff is conducted. Results are publicly available within 3 months after polls are conducted. During the face-to-face visit, it was found that although student surveys are carried out after completion of study courses, students need to receive feedback on the recommendations made in the surveys and whether anything is considered.

Different ways of collaboration were established (proactive involvement from academic staff with the aim to improve teaching; student`s assessment and participation in regular management meetings; collaboration with social partners e.g. during Career Days). But, it should be noted that face-to-face interviews with students indicated that students were not informed about review status after course finalisation.

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

Quality assessment measures (survey and questionnaire results) have been used to assure effective results. The Self Evaluation Report includes practical examples (e.g. after low evaluation results in 2019 about laboratory equipment the Committee decided to provide additional equipment), how improvement actions were introduced. Different data collection and analytical solutions were used that allowed identifying shortcomings. Questions to each of stakeholder groups were different, e.g. academic staff interviews indicate quality of studies, while interviews with students help to catch advantages and problems during the study process. All decisions regarding studies were publicly available for stakeholders. This, in the Self Evaluation Report included information is controversial with face-to-face interview results, as students stated that actually they were not familiar with analysis of study course evaluation analysis.

Quality assessment measures (data collection, analysis and evaluation) were performed, and higher management, academic staff as well, is very interested to introduce newest research trends, to realise the Programme according to market needs, to reach the progress in teaching and science. Students and alumni participation is rather low.

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

Surveys for learning and teaching in the last 2 years were conducted at the end of each semester. These surveys cover skills obtaining questions, potential of analytical thinking, improvement of creativity and presentation skills, etc.

Overall results of surveys show high scores (9 points of 10), and also positively that during the last survey all students participated in the survey. Also from graduates, evaluation of study programme is very high, highest marks were given for administrative staff support (4 from 4), and for other fields evaluation (teachers consultations, library resources, studies workload) wasn`t lower than 3.83 (of 4) evaluation is quite high. During the evaluation, graduates indicated that information about mobility opportunities could be higher, that point was identified during the face-to-face interviews. Students indicated that they would be ready to participate in short term mobility activities.

The involvement of 100% of students in surveys on the quality of studies is highly appreciated, including the positive that possible communication routes are different, including anonymous

communication. Survey results show insufficient information on mobility opportunities for students. Also, face-to-face interviews indicated that students' involvement in administrative activities is rather low, it also covers activities within the Self Evaluation Report preparation process.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Study programme quality management system is well established and functioning.
2. Students are offered a number of options (both personalised and anonymous) to participate in the management of the study process.
3. Various types of surveys are effectively used to identify shortcomings and solve problems promptly, including ensuring continuous growth and improvement of the study programme.

(2) Weaknesses:

1. There is potential to improve collaboration with social partners, students and alumni in a more systematic way.
2. It would be recommended to involve students in the self-evaluation report preparation process.

V. RECOMMENDATIONS

Evaluation Area	Recommendations for the Evaluation Area (study cycle)
Intended and achieved learning outcomes and curriculum	Continuous follow-up (legislative) and systematic updating of material in the field would avoid including outdated information in the reports.
Links between science (art) and studies	Improve the workload model for training and research for academic staff.
Student admission and support	To improve attraction activities of students, as well as to promote outgoing and incoming mobility of students.
Teaching and learning, student performance and graduate employment	Collaboration with scientific institutions outside the University in students' research work should be improved, and more active and true involvement of students, alumni, social partners and potential employers in the revision and improvement of the study program can be recommended.
Teaching staff	In the implementation of successful management of the programme, it is necessary to develop and implement a plan for renewal and workload of academic staff.
Learning facilities and resources	The participation in international research projects or networks would be beneficial for the renewal and maintenance of scientific equipment in laboratories used for teaching and research.
Study quality management and public information	Improve students' and alumni involvement in administrative activities in systemic cooperation approach ways.

VI. SUMMARY

Vytautas Magnus University started a second cycle Industrial Ecology programme in 2017. Evaluation is prepared for Natural Resource Technology study field consisting of second cycle study programme Industrial Ecology. The establishment of the study programme was determined by several factors and expected future challenges related to sustainable development, acute environmental and energy innovations, and social needs to ensure growth. The curriculum is stringent while integrating several aspects - environmental quality, climate change, resources, energy, and legislation - are addressed. The European Green Deal also supports this approach.

In view of developments, it is understandable that the demand for specialists in this field will increase cardinally, confirming the necessity of such a study programme. Excellent feedback from employers on graduates of the Industrial Ecology study programme, whose preparedness for the labour market is very high, they also described new specialists as persons with extensive and deep knowledge and skills, able to develop sustainable solutions that balance environmental, health, business and social interests.

It is evident that trends in both national, regional and international sectors are taken into account in the process of realisation of the study programme - study courses are regularly updated, annual internal study programme evaluations are prepared to analyse the achieved objectives, research and science play an essential role in the implementation of study courses, final work (master's thesis) is carried out in combination with scientific research and applied science. Such an approach is common, but academic staff were found to have an extremely high teaching and scientific workload. Although teachers are enthusiastic and specialists in their field, it would be desirable to balance this load.

The relatively small number of students (and graduates) poses risks for the long-term sustainability of the study programme, so the management staff of the study field should seek ways and opportunities to promote the study programme and increase the number of local and international students. Given that the English language knowledge of academic staff is sufficient, attracting international students would be an excellent solution to developing the program. In addition to attracting students, it can be seen that student mobility rates are extremely low. During the face-to-face visit, it was found that students would like to go on short-term mobility, so it would be desirable to promote such opportunities more.

It was found to be a well-established and functioning system for the qualification improvement of academic staff. The competence and qualifications of academic staff are very high, and innovative and personalised learning methods are used in the study process to ensure the achievement of study objectives. However, there is still room for improvement in this area, such as cooperation with other scientific institutions. To improve the study programme's quality, more efficient collaboration with students, graduates, and employers would be recommended. And that cooperation should be systematic.

The infrastructure for ensuring the study process is sufficient, and laboratories are adequately equipped so that students can implement activities to achieve study objectives and develop

research and master's thesis. Information (libraries) and IT resources are also sufficient. However, increased cooperation with other universities, particularly international cooperation research projects, could improve the situation.

Expert panel chairperson signature:
Assoc. Prof. Dr. Iveta Šteinberga