



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus Gedimino technikos universiteto  
**STUDIJŲ PROGRAMOS *PRAMONĖS INŽINERIJA***  
*(valstybinis kodas - 621H77001)*  
**VERTINIMO IŠVADOS**

---

**EVALUATION REPORT**  
**OF *INDUSTRIAL ENGINEERING* (state code - 621H77001)**  
**STUDY PROGRAMME**  
at Vilnius Gediminas Technical University

1. **Prof. Marti Casadesus (team leader)**, *academic*,
2. **Prof. Johan Malmqvist**, *academic*,
3. **Dr. Oluremi Olatunbosun** *academic*,
4. **Dr. Vincas Benevičius**, *representative of social partners*,
5. **Ms. Žiedūnė Sabaitytė**, *students' representative*.

Evaluation coordinator –  
**Ms. Ina Šeščilienė.**

Išvados parengtos anglų kalba  
Report language – English

Vilnius  
2016

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<b><i>Pramonės inžinerija</i></b>
Valstybinis kodas	621H77001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Gamybos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinė (2)
Studijų programos apimtis kreditais	120
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Gamybos inžinerijos magistras
Studijų programos įregistravimo data	2001

---

## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<b><i>Industrial Engineering</i></b>
State code	621H77001
Study area	Technological Sciences
Study field	Production and Manufacturing Engineering
Type of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full-time (2)
Volume of the study programme in credits	120
Degree and (or) professional qualifications awarded	Master of Manufacturing Engineering
Date of registration of the study programme	2001

## CONTENTS

<b>I. INTRODUCTION .....</b>	<b>4</b>
1.1. Background of the evaluation process .....	4
1.2. General .....	4
1.3. Background of the HEI/Faculty/Study field/ Additional information .....	4
1.4. The Review Team.....	5
<b>II. PROGRAMME ANALYSIS.....</b>	<b>6</b>
2.1. Programme aims and learning outcomes.....	6
2.3. Teaching staff.....	8
2.4. Facilities and learning resources .....	10
2.5. Study process and students' performance assessment .....	10
2.6. Programme management .....	12
<b>III. RECOMMENDATIONS .....</b>	<b>14</b>
<b>IV. SUMMARY .....</b>	<b>15</b>
<b>V. GENERAL ASSESSMENT .....</b>	<b>189</b>

## I. INTRODUCTION

### 1.1. Background of the evaluation process

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

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

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

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

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

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

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

### 1.2. General

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

No.	Name of the document
1.	Results of the students surveys of the study programme

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

Vilnius Gediminas Technical University (hereafter – VGTU) is a state higher school. It is formed of 10 faculties that offer different studies (Bachelors, Masters and Doctorals) on the technical area.

The Master programme in Industrial Engineering is organized on the Faculty of Mechanics by, in majority, the professors from the Department of Mechanical Engineering. This Department was created in 2013 as a merge of the previous Department of management of industrial enterprises and the department of machine engineering. The Faculty organises 5 more Masters and 3 Bachelors in the same study field: “Production and manufacturing engineering”.

The Master study program Industrial Engineering is a second-cycle study oriented to academic and practical applications on the field of engineering solutions for design and manufacturing. In March 2009 an external evaluation of the study programme was conducted by an International Group of Experts on behalf of the Lithuanian Centre for Quality Assessment in Higher Education (SKVC). As a result, the experts an unconditional accreditation for the programme, including next 6 recommendations:

- To link more closely the aims and tasks of the study programme with the needs of the labour market.
- To correct the study programme according to the general requirements set for master study programme.
- To combine the theoretical and practical parts of the programme in a more rational way.
- To introduce more actively new methods of studies.
- To extend the quality assurance process and specify its periodicity more closely.
- To encourage the university teachers involved in the programme to participate more actively in the qualification improvement processes.

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

The review team was completed according *Description of experts' recruitment*, approved by order No. 1-01-151 of Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on 6<sup>th</sup> December, 2016.

- 1. Prof. Martí Casadesus (team leader)**, *Full Professor, Department of Management, University of Girona, PhD in Industrial Engineering, Spain;*
- 2. Prof. Johan L. Malmqvist**, *Chair Professor, Department of Product & Production Development, Dean of Education at Chalmers University of Technology, Göteborg, Sweden;*
- 3. Dr. Oluremi Olatunbosun** *Head of Vehicle Dynamics Laboratory, School of Mechanical Engineering, University of Birmingham, United Kingdom;*
- 4. Dr. Vincas Benevičius**, *director of the private limited liability company „Žali žali“, Lithuania;*
- 5. Ms. Žiedūnė Sabaitytė**, *student of Aleksandras Stulginskis University study programme Hydraulic Engineering, Lithuania;*

**Evaluation coordinator – Ms. Ina Šeščilienė.**

## II. PROGRAMME ANALYSIS

### 2.1. Programme aims and learning outcomes

- The aims of the Industrial Engineering master programme are **well defined, clear and publicly accessible** through the web-site of the VGTU. This information appears in Lithuanian and in English.
- In summary, the aims of the programme are to provide students with specialized knowledge in Industrial engineering, to develop specialized skills for tackling manufacturing and technical industrial problems, to develop skills in management and interest in industrial innovations. These aims are relevant for future technical specialists and managers of industrial companies in Lithuania and worldwide. Additionally, it is obvious that the need for this graduates of this master's programme is increasing in Lithuania and in Europe in general.

According to the SER, and in line with the conclusions from the previous external assessment, the **programme aims** have been adjusted for a better connection with the State and regional development perspective, and designed according to the **professional requirements, public needs, the needs of the labour market**. In fact, during the employer's interview, excellent relations between employers and the programme were detected. However, no participation in the design of the programme by the different stakeholders is evident.

- For the definition of the learning outcomes of the programme, the Lithuanian Quality Framework (Level VII) and the EUR-ACE standards for second cycle degrees were considered. Learning outcomes are structured into "Knowledge and skills", "Research skills", "Engineering analysis and design skills", "Practical skills in solution of engineering tasks" and "Personal and social skills", resulting in 17 reasonable learning outcomes for the aim of the programme.

Although it is stated that the learning outcomes are totally aligned to the 8 groups of EUR-ACE's standards 2015, not all the requirements have been fully covered. For example, "communication", "team working" or "leadership" are not expected outcomes of the programme, although they are included in the group "Communication and team working" (according to the EUR-ACE standards 2015: *ability to function effectively in national and international contexts, as a member or leader of a team, that may be composed of different disciplines and levels, and that may use virtual communication tools*), or project management (EUR-ACE standards 2015: *critical awareness of economic, organisational and managerial issues, such as project management, risk and change management*). Considering that, according to the audience with the staff, these learning outcomes are informally addressed during the courses, a further revision is necessary of the links between subjects and learning outcomes. This will help in ensuring that all teachers know about the expected learning outcomes of their subjects.

It is important to ensure that staff and students know clearly what learning outcomes are assigned to each subject. That will open the door to the coordination between subjects, and finally, increase the possibilities to achieve all of these expected learning outcomes. Nowadays, this information is not publicly accessible on the web-site, and it is needed. Additionally, and according to the audiences, it is not clear that all the staff know exactly the expected learning outcomes assigned to their subjects, and consequently there is no coordination with the rest of the teachers with the same learning outcomes assigned.

However, it can be considered that, in general, **these learning outcomes are founded on the professional requirements, public needs and the needs of the labour market.**

- Although the expected learning outcomes of the programme do not meet exactly the EUR-ACE standards for master degree programmes, as it is expressed in the SER, aims and learning outcomes are **consistent with the type and level of studies and the level of qualifications offered.**
- The name of the programme, its learning outcomes, content and the qualifications offered **are compatible with each other.** However, it seems reasonable that the ability to present results in at least one foreign language (Learning outcome ACG2) has to be developed in different subjects, not only in the ones related to the Master Thesis (1, 2, 3 and 4). A further revision of the link between subjects and learning outcomes is still needed.

## 2.2. Curriculum design

- The structure of the programme comprises 120 ECTS during 2 years in full-time mode. It is delivered in Lithuanian. It is divided into 75 ECTS in subjects of the study field, 39 ECTS of the final degree project (divided into 4 different subjects), 3 ECTS on elective subjects and 3 ECTS in the general subject course of the University: “Fundamentals of research and innovation”. The maximum number of credits per year is 60 ECTS, with a maximum of 5 course units per semester. All subjects are at least of 3 ECTS. Consequently, the curriculum design meets **legal requirements.**
- On the web-site there is only general information about every subject: course aim, course description, prerequisites, ... However, more information is needed about every subject, linking the course with the information of the responsible staff (already on the web-site). Considering the information in the SER, the study subjects and/or modules are spread evenly and their **themes** are, in general, **not repetitive.** Some repetitions are detected, between “Products quality” and “Reliability of mechanical systems” (Quality costs), but they are not relevant. The content of the subjects is, in general, adequate.

The curriculum is linked through the courses subjects studied in the first cycle of the Production engineering and management study programme. The contents and themes linking between both programmes are adequate and, according to the students, there is no unnecessary overlapping.

It is interesting to stress the possibility to develop part of the project during different semesters. However, according to the SER, all final works are developed individually, losing the opportunity to work in project teams, developing learning outcomes that are difficult to obtain in other subjects. This project is obviously a good chance to carry out projects in team working, developing the capacity to manage projects of the students.

Additionally, the programme has to be encouraged to introduce lectures in English, not only for assuring learning outcome “ACG2. (...) to present results of works in writing or verbally in correct state language and at least one foreign language”, but also to improve its needed international orientation.

- After revising the course cards of every subject, it is clear that the content of the subjects **is consistent** with the expected content of an European Master (EQF Level VII).

Additionally, after analysing some selected final degree projects, almost all of them are focused on “industrial engineering” and many of them related to “research”.

- The scope of the programme is **sufficient**, in general, to ensure learning outcomes. However, considering that one of the aims of the programme is “T3. To form skills in management and.....” a major impact of “management subjects” on the curriculum could be expected. Only one subject, “Products quality” could be considered purely about management. It will be desirable to include at least one subject focused on “Production management” or “Control of manufacturing processes” for instance.

Interviews with employers confirm the need to adapt the curriculum to a wider view of the industrial engineering practice, including for example courses on human resources management or financial analysis. That could be done by increasing the actual low number of elective subjects: only 3 ECTS in the Curriculum.

- After analysing the information in the SER (unfortunately the information on the website is very scarce), it is considered that many of the relationships between subjects and expected learning outcomes are not aligned, and they should be revised. For example, according to the table that links both concepts in the SER, “Engineering ecology” has seven expected learning outcomes, but according to the course card of the subject there are only three. In the subject “New manufacturing processes” no expected learning outcomes appear on the course card. The problem is that, for example, the expected learning outcome: “*IVG1. An ability to tackle engineering problems, to convey scientific & technical information in an argued, clear and truthful way both verbally and in writing to listeners of various qualification levels*” is only assigned to these two subjects and to the Master Thesis.

This problem has been detected in different subjects, so it is not clear that the subjects of the whole programme have been designed in concordance with the learning outcomes. There is no way to ensure that all the learning outcomes will be achieved for the students. This inconsistency shows differences between the planned learning outcomes, and the ones that the teachers develop in their subjects. This is obviously an issue to solve. Then, if in the course card this learning outcome doesn't appear, no one will be responsible for teaching how to “convey information to listeners of various qualifications levels” for example.

However, it must be pointed that the content and methods of the subjects are **in general appropriate** for the achievement of the intended learning outcomes of the programme.

- Finally, it is confirmed that content of the programme reflects some of the **latest achievements** in industrial engineering. In fact, there is one subject focused on this objective (“New manufacturing processes”) and, additionally, some of them are presented in other subjects. However, according to the employers, still some improvements could be made in some subjects in order to improve the programme, for example lean management. Alumni suggest too, to include more visiting professors from the industry and excursions to industries to see new trends in the field.

### 2.3. Teaching staff

- Although the number of teaching staff of the programme varies from year to year, on average it meets the **legal requirements**: All of the lecturers of the study subjects have a scientific degree, and field of scientific activities of all of them complies with their taught study subjects. On average, during the last 5 years, 6 professors and 6 docents were involved in the teaching of the programme.
- The **qualifications** of the teaching staff of the programme are adequate for the



programme. They have many years of experience on the programme, and they are participating actively in different workshops, all of them related to “industrial engineering”.

However, it is important to stress that all of them had their PhD from a Lithuanian institution, and the majority of them from VGTU. Although this is not obviously a negative point, it is necessary to continuously increase the internationalization of the staff. Then, although the number of staff visiting other institutions is relevant (10 in 2015 for example), it is important to continuously support and maintain this participation. Continuous support for participating in Erasmus teaching interchanges for staff is also relevant. It is crucial to reinforce the contacts with other European Universities.

According to the interviewed students, the teachers of the programme are well qualified and they have an excellent access to them.

- On average, 6 professors and 6 docents are involved in the programme. Considering the number of students, a ratio of 1.33 of students per teacher is delivered. Then, the **number of the teaching staff** is adequate to guarantee successful teaching.

There is a need that a brief CV of the professors is easily accessible from the program and subjects, especially if there is the need to attract international students.

- During the last five-year period, seven PhD students from the Department defended their theses and 5 of them became part of the staff of the Department. Considering the number of staff of the programme, and their ages, it could be considered that during this period the **teaching staff turnover** is sufficient to assure an adequate provision of the programme.

However, it has to be noted that the Department needs to take care about training future teachers as well, considering that recently employed lecturers were PhD students from the same department. It is necessary that when the Department employ new lecturers, academics from abroad can be considered. If this is not realistic due to different circumstances, it will be necessary that, at least, all new staff have carried out their PhD or part of it outside the Department. And additionally, it is necessary to motivate all the staff to participate in teaching and training interchanges (For example, Erasmus +) or, if it possible, to motive them to work on probation outside Lithuania.

Additionally, the programme has a balanced composition in terms of age of faculty.

- VGTU creates some **conditions for the professional development** of the teaching staff involved in the programme. For example, according to the SER, some academic staff have been participating in different courses organised by the University or work on probation. However, according to the audiences, the staff could participate more in courses or training developed by the University or the Faculty such as teaching methodologies, languages, dealing with the students, etc. In fact, a policy or plan for training in the Faculty and in the Department does not exist. Then, it would be relevant to stress the importance of considering training that could increase the staff internationalization: traineeship at foreign studies, research at foreign research institutions, etc.
- The teaching staff of the programme is **involved in research** related to the programme, although it is necessary to increase their international impact. During the last 5 years, some of them have participated in research conferences abroad, in research projects funded by the Lithuanian State Science and Studies Foundation, and one FP7 project. Some of the academics had participated in other EU study projects not directly related to research, focused in general on the Lithuanian higher education sector.

It is clear that it is necessary to increase the involvement of the academic staff in the international research: implementation of research projects and publishing in well-known journals. In general, the staff publications are not in the journals with a high academic impact; and it needs to be increased.

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

- The programme is carried out at premises of the Faculty of Mechanics. The programme disposes sufficient spaces (auditoriums, laboratories, computer classes, common working classes, ...) for the teaching process. According to the SER the Faculty includes 26 premises with nearly 900 working-places. Their technical and hygienic conditions are good. The majority of the classrooms and laboratories have multimedia equipment. After the site visit, it is confirmed that the **premises** for studies are adequate both in their size and quality.
- In general, the **teaching and learning equipment** (laboratory machining and computer equipment, consumables) are adequate for the programme. The 4 computer classrooms are sufficient and adequately equipped with updated software (LabVIEW, AUTOCAD, Matlab, ...) to allow students to work individually while there are no lessons taking place.

According to the student's audience, there are no problems related to the size and quality of the teaching equipment. In general, laboratories can be used anytime students need it.

- There are no **arrangements for students'** practice, because all are already working in different industrial enterprises. In the student's audience, it was confirmed that in order not to lose their actual, in general they don't want to participate in Erasmus exchanges.
- **Teaching materials** available in the Library (textbooks, books, scientific journals) are adequate and accessible. There is access to sufficient journals and e-books for developing the programme and further research in the field. However, it is necessary to increase the number of guides prepared by the teachers, considering the lack of literature in the speciality in Lithuanian. A good practice could be to encourage the use of e-books resources and, in general, all kinds of resources at the Library. At the same time, it will be interesting to encourage students to practice other languages during their learning process, especially important in this field.

Moodle is used in some subjects, but it is still not in the majority of subjects. There is a need to improve the learning process of the students with these tools and resources, especially for the students that can't participate in all the activities.

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

- The **admission requirements** are well-founded: the majority of the students involved in the programme are bachelors who graduated from the first-cycle studies at the same Faculty.

The number of enrolled students is, on average, 10 during the last years. However, the dropout rate is very high. For example, last year only 8 students enrolled in the programme and 5 dropped out. In fact, it is claimed that 3 to 5 out of 8 to 14 students drop out on average. There is a need to have a new strategy and plan to increase the number of enrolments and reduce the dropout rate of the programme, and increase the motivation of the actual students to avoid dropouts.

- All the lectures are organised during the afternoon-evening allowing students to work

during the morning. This **organisation of the study process** together with the distribution of the academic activities' load assures an **adequate provision of the programme**. Theoretical lectures, laboratories works and the Final Work, ensures the achievement of the expected learning outcomes.

According to the interviewed students, the balance between theory and practice is adequate. However, there is a lack of study visits to exhibitions and excursions to industrial companies. It will be necessary too, to include visiting professors to the courses sharing new trends in the industrial sector.

Additionally, there is a need to expand the use of distance learning platforms, such as Moodle, to all the courses.

- Three of the expected learning outcomes of the programme are related to research. These outcomes are linked to different subjects, with different relevance according to the cards of the programme. In fact one of the subjects, common to many programmes of the VGTU, is focused on "Fundamentals of research and innovations". All the students have to present the results of their "Final Works" at a scientific conference: the annual VGTU conference for young Lithuanian scientists or another one organised at KTU in general. Later on, the best works are published in a scientific Lithuanian Journal. So, it is considered that students are clearly encouraged to develop independent works or **research**.
- VGTU has different ERASMUS+ agreements with HEIs in Europe, allowing students to participate in **student mobility programmes**. However, there is no evidence that any student from the programme has participated recently. Considering that the programme is in Lithuanian, no students from abroad has enrolled to the programme. There is clearly a need to increase the internationalization of the programme, considering their worldwide recognition, and ERASMUS+ is a possibility to explore.
- VGTU ensures an adequate level **of academic and social support**. For example, students have access to the Students' Union and support to participate in sports, health care and culture activities. There is support too for the students from abroad (dormitories), and for the students with financial problems. During the audience with students, it was stated that they considered that the support from academics and students are in general excellent.
- The description of the **assessment system** of students' performance is clear and adequate. They are announced at the beginning of the studies, and they appear at the descriptor of every subject, although it is not available on the web-site. The mark is calculated using the marks of the outcomes in the specific subject. In general, the student can only be admitted to the exam after the settlement for the term papers and the projects.

That methodology ensures the continuous work of the students during the course. Additionally, in the content cards of every subject, the relation between the expected learning outcomes, the teaching learning methods and the assessment methods is not defined.

The designed process for assessing the Final Work, by the Board for Master's Degree Conferring (BMDC) is clear and adequate.

- Although the labour market is not excellent at this moment, the employment of the graduates in the Industrial Engineering Master is not a problem. In 2014-2015 90% of the graduates are working. 84 % of them are working in their speciality.

According to the interviewed alumni, they were all satisfied with the employment that they get. Their employment corresponds to their degree. If it was the case, these alumni will repeat the same programme at VGTU. Employers are well satisfied too with the level of the graduates of the programme, although they would like them to do more practical work as well as business and IT knowledge. Definitely, it can be considered, that **professional activities** of graduates meets the programme providers' clearly expectations.

## **2.6. Programme management**

- The **responsibilities for the implementation and monitoring of the programme** are clearly allocated: The Council of the Faculty is the decision making body on new or updated programmes at the Faculty Level. Its proposal comes from the Study Committee Programme which is the responsible for a settlement of problems of studies. This committee monitors and revises, annually, the structure and content of the programme. Members of the Study Committee are academics, one social partner and representatives of students. However, it is necessary to have a stronger leadership for the management of the programme, defining clearly who has the ultimate responsibility.

The staff of the Department develops and improves the subjects of the study programme. They are revised for the period from 1 to 4 years. Although they are supposed to design the content of each subject considering the expected learning outcomes, the contents don't reflect exactly this relation. A further revision of the alignment of the subjects of the programme with the expected learning outcomes needs to be done.

- **Information and data for the assessment of the programme** are collected periodically. This includes a periodic assessment of a student's polling at the end of the semester. However the obtained data are not published (in an aggregate way), and the students doesn't receive any feedback of the results and the actions taken. It is needed that all the stakeholders receive some feedback of any action carried out using their opinions.

However, in an informal way, students interact fluently with the Department's staff in order to improve the programme.

- The **outcomes of the previous external evaluation** (2008) have been used for the improvement of the programme. Many of the detected issues have been solved, but there is still room for improvement. For example, according to the employees there are still some lacks on the definition of the programme related to "project management" and there is a need for developing a wider understanding of the "businesses world" by the students. The alumni claim there is necessity to increase practical works, one of the recommendations of the previous assessment.
- **Stakeholders, basically graduates and employers, are involved** in the assessment and improvement of programmes. For example, one of the social partners is a member of the Study Programme Committee and, together with a representative of the students, participates in assessing the programme. However, according to the audience with the employers, the social partners would like to participate more actively in the improvement process of the programme. A formal and a systematic way to gather the interest of many social partners, not only one representative, is needed. They would like to participate more on the definition of the curriculum of the programme, and to suggest some of the contents of some subjects.

According to the audiences, in general the opinion of the stakeholders (alumni, students and employers), the programme is excellent. According to the surveys to the stakeholders, the results about the education and their conditions are satisfactory although

it doesn't seem that the programme influences very much the employability of the graduates.

- About the **internal quality management system**, the University has implemented ISO 9001 as quality management system. However, there are still some essential processes in an internal quality management system to be efficiently implemented, for example: measuring graduates and employee's satisfaction, or managing public information. Consequently there is a need to improve the public information of the programme (course cards, indicators,). Especially, it is needed to implement the processes for improving the programme, including actions plans (actions, responsibilities, timeline, ...).

### **III. RECOMMENDATIONS**

1. Revising learning outcomes of the programme, linking them correctly to each subject, and ensuring that all the intended learning outcomes can be achieved. Ensuring that every responsible teacher of every subject knows exactly the expected learning outcomes, increasing their qualifications in these topics when it is possible.
2. Need to include new subjects in the curriculum that address the need of having a wider understanding of the industrial engineering practice.
3. Increase the number of ECTS available for elective courses.
4. Improve the information on the web-site, especially information that is related to the course cards and the link to the staff CVs (already on the Department website).
5. Increase the internationalization of the staff, in teaching and in research. Increase the number of interchanges with other European Universities (Erasmus Programme for teachers) and increasing the international impact of the research (projects and publications) is needed.
6. Expand the use of digital learning platforms to all subjects.
7. Include some study visits and visits to exhibitions on the programme.
8. Include some visiting professors or professionals in the courses.
9. Need for the implementation of an effective strategy for increasing the recruitment of new students and reducing the dropout rate, considering their high employability and the low number of new students and the dropout rate.
10. Formalize the industry relations in a framework for gathering data, analysing and improving the programme periodically.

#### **IV. SUMMARY**

The main strengths and weakness of the master programme in Industrial Engineering at VGTU, according to each one of the analysed standards, are presented in the *Summary*.

##### ***Evaluation area “Programme aims and learning outcomes”.***

The strength of programme is that it addresses the needs of industrial companies of the region and its graduates are very likely to find employment. Its aims are comparable to similar programmes in Lithuania and all around the world. It prepares for engineering roles in the Lithuanian industry. Learning outcomes are, in general, derived from EUR-ACE specifications, validating the programme to international standards.

The weakness of the programme is that there are detected some lacks in the learning outcomes, compared with the EUR-ACE requirements. However, some of them are very relevant as the ones related to: “Communication”, “Team working” and “Leadership”. Considering that some of them are already informally addressed during the courses, a further revision of the links between subjects and learning outcomes is necessary. This will help in ensuring that all teachers know about the expected learning outcomes of their subjects. Additionally, it has to be considered that no public information of the link between learning outcomes and subjects.

##### ***Evaluation area “Curriculum design”.***

The strength of programme is that the curriculum is in general appropriate, focused on the main issues in the “Industrial engineering” field. It includes an adequate balance between theory and practice.

The weakness of the programme is that the contents of the study program could be supplemented with other courses related to human resources management or financial analysis for example, in order to have a wider view of the industrial engineering practice. However, only 3 ECTS are available for elective courses. Additionally it has been detected minor repetitive contents between subjects are detected. The programme needs to improve the public information on the web-site about every subject, linking the information about the CV of the staff (already on the web-site) to the subject’s contents.

##### ***Evaluation area “Teaching staff”.***

The strength of programme is that all teachers are well qualified, sufficiently experienced and meet the qualification requirements to execute the Industrial engineering master’s programme.

Additionally, the relation between teaching staff and students, alumni and social partners is excellent. It is detected too, a growing involvement in international mobility programmes even though visits are very short.

The weakness of the programme is a low internationalisation of staff: low participation in research projects and low impact of their research internationally (not local), and a low participation, in general, of lecturers in qualification courses. On another hand, the relation between learning outcomes and subjects is not always clear to the teachers. Consequently, there is no formal coordination between teachers implied in subjects that share the same learning outcomes.

#### ***Evaluation area “Facilities and learning resources”.***

The strength of programme is that the facilities (classrooms, laboratories and computer classrooms) are adequate for the development of the industrial engineering programme. In fact, students have a good access and services of the library, and a good access to updated computer software for the programme.

The weakness of the programme is detected a lack of motivation of teachers to increase the use of digital learning platforms.

#### ***Evaluation area “Study process and student assessment”.***

The strength of programme is that the admission to the study programme is adequate. The scheduling of the programme is adequate too, and the employment rates of the graduates are very high. In general, the satisfaction of the students with the teaching methodologies and subjects’ assessment is very high.

The weakness of the programme is detected need of implementing an effective strategy for maintaining the recruitment of students and to reduce the dropout rate of the programme. On another hand, there is a lack of site visits on the courses and there is a need to expand the use of distance learning platforms to all subjects.

#### ***Evaluation area “Programme management”.***

The strength of programme is that there is a clear definition of the responsibilities of the management of the programme and the role of the Study Programme Committee. Additionally, it is implemented a system for gathering the opinion periodically of the students in the programme. It exists a very good informal cooperation with social partners.

The weakness of the programme is detected a need to formalise the industry relations analysing formally their needs and trends. It is required a stronger leadership for the management of the



programme. In order to continuously improve the programme, it is detected too a lack in the actions plans for improvement, including the definition of responsibilities and timeline.

## V. GENERAL ASSESSMENT

The study programme *Industrial Engineering* (state code – 621H77001) at Vilnius Gediminas Technical University is given **positive** evaluation.

*Study programme assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation of an area in points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Teaching staff	3
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	3
6.	Programme management	3
	<b>Total:</b>	<b>18</b>

\*1 (unsatisfactory) - there are essential shortcomings that must be eliminated;

2 (satisfactory) - meets the established minimum requirements, needs improvement;

3 (good) - the field develops systematically, has distinctive features;

4 (very good) - the field is exceptionally good.

Grupės vadovas: Team leader:	Prof. Marti Casadesus
Grupės nariai: Team members:	Prof. Johan L. Malmqvist
	Dr. Oluremi Olatunbosun
	Dr. Vincas Benevičius
	Ms. Žiedūnė Sabaitytė