STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

VILNIAUS TECHNOLOGIJŲ IR DIZAINO KOLEGIJOS

STUDIJŲ PROGRAMOS

MECHANINIŲ TECHNOLOGIJŲ INŽINERIJA (valstybinis kodas – 653H30002)

VERTINIMO IŠVADOS

EVALUATION REPORT

OF *MECHANICAL TECHNOLOGIES ENGINEERING (state code – 653H30002)*

STUDY PROGRAMME

At VILNIUS COLLEGE OF TECHNOLOGIES AND DESIGN

1. **Dr. Oluremi Ayotunde Olatunbosun (team leader),** *academic*
2. **Dr. Rynno Lohmus,** *academic*
3. **Dr. Bojan Dolšak,** *academic*
4. **Dr. Andrius Vilkauskas,** *academic*
5. **Dr. Vigantas Kumšlytis,** *representative of social partners*
6. **Mr. Justinas Staugaitis**, *student representative*

Išvados parengtos anglų kalba
Report language - English

Vilnius
2015

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Mechaninių technologijų inžinerija***
Valstybinis kodas	653H30002
Studijų sritis	Technologijos mokslai
Studijų kryptis	Mechanikos inžinerija
Studijų programos rūšis	Koleginės studijos
Studijų pakopa	Pirmoji
Studijų forma (trukmė metais)	nuolatinės (3), ištęstinės (4)
Studijų programos apimtis kreditais	180
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Mechanikos inžinerijos profesinis bakalauras
Studijų programos įregistravimo data	2012-01-04 Nr. SV2-3

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	***Mechanical Technologies Engineering***
State code	653H30002
Study area	Technology Sciences
Study field	Mechanical Engineering
Type of the study programme	College studies
Study cycle	First cycle
Study mode (length in years)	Full-time (3), part-time (4)
Volume of the study programme in credits	180
Degree and (or) professional qualifications awarded	Professional Bachelor in Mechanical Engineerring
Date of registration of the study programme	04-1-2012 No. SV2-3

CONTENTS

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 the 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 SKVC. Along with the self-evaluation report and annexes, no additional documents have been provided by the HEI before, during and/or after the site-visit.

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

Higher education study programme (college type) of Mechanical Technologies Engineering (hereinafter – "MTE") in the study field of Mechanical Engineering is implemented and performed by the Vilnius College of Technologies and Design. The MTE study programme is supervised by the Mechanical Engineering Department (hereinafter – the "Department") of the Technical Faculty.

The structure of Vilnius College of Technologies and Design allows pooling facilities and financial and human resources for the learning process which are necessary for implementation of the study programme

The MTE programme has been implemented since 2003 but is constantly revised and amended according to changes in legal acts. In 2012 study programme *Mechanical Technologies Engineering* was substantially updated according to 2007–2013 Human resources development programme 2 priority "Lifelong learning", VP1-2.2-ŠMM-07-K-01-090 project measure "Improving studies quality, enhancing internationality"[1]. The updated study programme in 2012

[1] 2007–2013 project founded by EU structural funds and LR ŠMM (Republic of Lithuania Ministry of Education and Science) financed measure "Improvement of the Studies Quality by Renovation of Engineering Study Field

was evaluated by EVALAG agency (Germany), which is included into the register European Association for Quality Assurance in Higher Education. Independent experts gave positive assessment of the renewed study programme *Mechanical Technologies Engineering* and awarded it a certificate issued by the European Agency for Quality Assurance in Higher Education and the right to mark the study programme with EVALAG quality mark. Considering experts' conclusions and recommendations, description of intended study programme MTE has been prepared and submitted for consideration to the Centre for Quality Assessment in Higher Education (SKVC). The study programme was revised in 2012 based on the learning outcomes, the ECTS concept and Dublin Descriptors.

Study programme MTE is registered as a new study programme (state code – 653H30002) and its implementation commenced since September 1, 2012.

1.4. The Review Team

The review team was assembled in accordance with the Expert Selection Procedure, approved by Order No 1-55 of 19 March 2007 of the Director of the Centre for Quality Assessment in Higher Education, as amended on 11 November 2011. The Review Visit to HEI was conducted by the team on 29th January, 2015.

1. Dr. Oluremi Ayotunde Olatunbosun (team leader), Senior Lecturer and Head of the Vehicle Dynamics Laboratory, School of Mechanical Engineering, University of Birmingham, United Kingdom.

2. Dr. Rynno Lohmus, Head of the commision of Estonian Higher Education Quality Agency; Senior Researcher at Faculty of Science and Technology, Institute of Physics, University of Tartu, Estonia.

3. Dr. Bojan Dolšak, Head of Laboratory for Intelligent CAD Systems, Associated Professor at Faculty of Mechanical Engineering, University of Maribor, Slovenia.

4. Dr. Andrius Vilkauskas, Dean of the Faculty of Mechanical Engineering and Design, Kaunas University of Technology, Lithuania.

5. Dr. Vigantas Kumšlytis, Manager of materials engineering and technical analysis at Public Company "Orlen Lietuva", Lithuania.

6. Mr. Justinas Staugaitis, Student representative. Lithuania

Programmes: "Thermal Engineering", "Mechanical Technologies Engineering" and "Rolling Stock Maintenance", No.VP1-2.2-ŠMM-07-K-01-090. Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Vilnius, Novmeber 2014.

II. PROGRAMME ANALYSIS

2.1. Programme aims and learning outcomes

The stated aim of the study programme of *Mechanical Technologies Engineering* at the Vilnius College of Technologies and Design – "to prepare to the labour market competitive, highly-qualified specialists of mechanical engineering able to work independently, apply the newest knowledge of technologies and solve professional problems in the area of mechanical engineering and production"[2].

The Self-evaluation report claims that the aim of the study programme is based on the requirements for specialists of engineering study field, as established by the TUNING-AHELO framework of expected/desired learning outcomes in engineering, European Standards for the Accreditation of Engineering Programmes (EUR-ACE) and insights on preparation of professional specialists, revealed in communication with Lithuanian companies' management and specialists. The analysis performed allowed not only to indicate and establish the characteristic activities performed by a specialist of mechanical engineering and necessary professional competence, but also to highlight both general and special abilities required for performance of such activities. The definition of programme aims and formulation of the learning outcomes have been formed by considering the results of research carried out by LINPRA (The Engineering Industries Association of Lithuania) which highlighted the industrial trends and critical competences of mechanical engineering specialist. The research revealed that the crucial competences for enterprises are: performing research, designing, development, manufacturing, testing and supervising mechanical equipment, including tools, engines, generators and various machines. Considering the results of the research, more attention is now paid to the development of competences of mechanical design, i.e. scope of the credits for Mechanics study subject was increased from 6 to 9 ECTS.

The learning outcomes of the programme of study are described in detail and stated in clear, non-technical form which can be understood by the general public. They are well defined, clearly stating the knowledge, awareness, abilities and skills which the graduate will be expected to possess on completion of the Bachelors programme. Learning outcome of an individual study subject foresees attainment of necessary knowledge and skills to achieve certain results established in the study programme. They are based on the academic and professional competences required of a Bachelor of Engineering in the general area of mechanical engineering and they comply with the aim of the study programme. A table is presented (Self-evaluation report, Table 2) which shows a mapping of individual study subjects to study programme learning outcomes but this table is rather simplistic. A more detailed information presentation in matrix form is recommended which maps generic learning outcomes to individual subjects at the appropriate level.

Study results are regularly revised considering the trends of science and technique and the changes in the labour market. In updating the study programme, cooperation with social stakeholders is very valuable. Social stakeholders in the Study Programme Committee are represented by Technical Director V.Perfilov, UAB ABPLANALP ENGINEERING[3]. Since the study programme renewal the content of the study subjects has also been amended for the following subjects: Material Research, Mechanics, Technical Measurements, Equipment of Metal Manufacturing Technologies, Equipment Design, Software Control Equipment, Metal

[2] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 10, Vilnius, November 2014.
[3] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 18, Vilnius, November 2014.

working Practice, Technological equipment and Technological Practice. This is also was explained during expert panel meeting with self-evaluation group and social partners.

During expert panel meeting on site with social partners they have been very enthusiastic regarding future employability of the graduates of MTE study programme and first graduates of 2015 will be very welcomed in the industry.

The programme aims and learning outcomes are consistent with the level of knowledge, awareness and skills requirements of professional Bachelors' degrees in general engineering internationally. They conform to the requirement for the qualification of the trained specialists established according to Level 6 of the Lithuanian Qualifications Framework and of the European Qualifications Framework for Lifelong Learning; and are based on the provisions of Dublin descriptors which state that a graduate from the first cycle of studies has to 'demonstrate and be able to apply knowledge and understanding supported by advanced textbooks knowledge and knowledge at the forefront of the study field, to be able to collect and interpret data in the field of studies, which are necessary for finding solutions to important social and engineering problems, to substantiate suggested solutions, devising and sustaining arguments, to communicate information to audiences of specialists and non-specialists, to possess skills of autonomous learning that are of relevance to pursuing degrees in further cycles of studies' [4].

The name of the programme - *Mechanical Technologies Engineering* – is appropriate given the three specializations of the study programme (Repair of Automobiles Mechanical Systems, Repair Technology of technological Equipment and Mechatronics systems of Technological Equipment). The degree is awarded in the field of Mechanical Engineering which is the most appropriate of the classifications approved by the Ministry of Education and Science. When information will be available about graduates' activities for the future programme evaluation Vilnius College of Technology and Design shall consider upgrade of the study programme. While study programme outcomes are specified in terms of generic engineering approach, study subject outcomes are more related to technological implementation and problem solving. This can cause some confusion for students so a mapping of generic learning outcomes to individual subjects is recommended.

Strengths

- The objective and learning outcomes of the study programme are formulated well having in mind what graduates are expected to possess on completion of the Bachelors programme. Study results are regularly revised considering the trends of science and technique and the changes in the labour market.
- In spite of the fact that the programme has run for only two years after the most recent changes and the first graduates will appear in 2015, it seems that graduates will easy fit in the labour market and will be demanded by the industry. This was confirmed by social partners.
- The objectives and learning outcomes of the study programme are in line with the type and cycle of study, and the level of qualification (Professional Bachelor).

Weaknesses

- The presentation of a more detailed information of connection and correlation of learning outcomes and individual subjects is necessary. Now students cannot quickly review and connect learning outcomes and subjects contributing to this outcome precisely. E.g.

[4] Dublin Descriptors, 2004. (http://www.jointquality.nl/content/descriptors/CompletesetDublinDescriptors.doc).

learning outcomes can be presented in matrix which maps generic learning outcomes to individual subjects at the appropriate level.

- From the programme content it is seen that learning outcomes concentrate on engineering approach, but individual subjects are more related with production (manufacturing or technological implementation) approach. It can initiate some confusion within students' expectations.

2.2. Curriculum design

The design of the MTE study programme meets requirements of the Description of General Requirements for Degree-Awarding First-Cycle and Integrated Study Programmes[5].

Study programme *Mechanical Technologies Engineering* is implemented in full-time mode of study and lasts 3 years. Study programme scope is 180 ECTS credits or 4,800 academic hours. Study comprises contact and individual work, consultations and professional practices. The number of contact hours in full-time studies is 2,485 hours, i.e. 51.77 per cent of total number of hours. Curriculum design of the study programme is presented in the Self-evaluation report, Table 4 and 24[6].

The study programme consists of general studies subjects, 15 ECTS credits (min requirement – 15 ECTS credits), study field subjects, 135 ECTS credits (min requirement – 135 ECTS credits), specialized studies subjects 30 ECTS credits (min requirement – 30 ECTS credits), internships 30 ECTS credits (min requirement – 30 ECTS credits), final thesis (project) 12 ECTS credits (min requirement – 9 ECTS credits), electives 9 ECTS (min requirement – 9 ECTS credits).

Specialized studies subjects includes: final thesis (project) 12 ECTS credits; electives 9 ECTS credits; final practice 6 ECTS credits (6 ECTS credits from total 30 ECTS credits for internships). Study field subjects includes: 24 ECTS credits of practices (internships). Total quantity of general, study field and specialized studies subjects is 180 ECTS credits.

Each academic year consists of 2 semesters with no more than 7 subjects delivered per semester.

Study programme's structure is designed in the way to help students study the subjects consecutively and gradually achieve learning outcomes. The structure of the study programme is divided in the three groups: general college study subjects, study field subjects and specialized study subjects.

The content of the study subjects is at the level that would be expected for a Professional Bachelors programme. A combination of lectures, tutorials, seminars and practical work is used in delivering the modules. Study programme pays sufficient attention to the basic engineering subjects to ensure good engineering background. Today's practice requires good communication and team working skills, which requires a good understanding about the project itself as well as project management but this knowledge is not fully delivered in the study programme. On other hand special attention is given to economics and two subjects are included in the programme: Economy Theory and Economy of Enterprises. It would be more appropriate to have one subject related with business economics and introduce Project Management as a subject in the study programme.

---

[5] Description of General Requirements for Degree-Awarding First Cycle and Integrated Study Programmes, approved by Order No V-501 of the Minister of Education and Science of the Republic of Lithuania of 09/04/2010.

[6] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 33, 34, Vilnius, November 2014

In order to keep updated in the newest technologies and their trends staff's mobility and foreign language communication skills are very important, and should be improved to ensure better updates of knowledge for the subjects related with the new technologies and materials.

The programme design and subjects allows to achieve learning outcomes, gives sufficient time for practical skills development, but in the later stages of studies especially in the final year the proportion of independent learning should be increased to encourage students' self-reliance and develop independent learning skills.

Strengths

- Study programme design allows programs aims and learning outcomes to be achieved. Study subjects are spread evenly over the programme.

Weaknesses

- Study programme structure itself allows sufficient horizontal (social) skills development, but looking from their future perspectives some subjects related with business understanding are too general and specific subjects related with business management are not introduced.

2.3. Teaching staff

The MTE study programme is delivered by 35 lecturers, 8of which are doctors of science and remaining are lecturers with appropriate pedagogical and practical experience. 27 lecturers have full time positions which ensure sustainability of the study programme. The proportion of subjects given by lecturers with PhD is sufficient and fully covers requirement for lectures delivered by lecturers with doctorate qualification (minimum requirement – 10%).

Lecturers' engagement in research in order to keep up with the latest trends in technology by their subject is needed. It also has to be pointed out that a lot of lecturers with PhD have part time position in the organization so this is limiting their involvement in College research activities.

Students – staff ratio is good – one teacher for 14,51 students (Self-evaluation report, Table 6)[7]. The rate of students per one teacher position is quite high, but this is in line with the requirements of Methodology for Evaluation of Actual Resources of a Higher Education Institution (no more than 20 students)[8]. This relatively high ratio between students and teachers might appear also for a reason that a lot lectures are given in streams to achieve higher efficiency of use of infrastructure and teaching staff.

The age profile of the lecturers is good with a good mix of experienced and younger staff. Staff turnover is insignificant – mainly due to retirement. However age distribution trends and upcoming retirements will demand attraction of new staff. College has to consider the attraction of new younger specialists to maintain the study programme in the near future. In the meantime 3 lecturers are pursuing PhD studies in various Lithuanian Universities. It is good practice of Faculty so it partially can help to solve this issue.

---

[7] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 57, Vilnius, November 2014

[8] Methodology for Evaluation of Actual Resources of a Higher Education Institution. Order No V-1170 of the Minister of Education and Science of the Republic of Lithuania of 01/07/2011 [accessed on 02/06/2014]. Internet access http://www.litlex.lt/scripts/sarasas2.dll?Tekstas=1&Id=150724.

Replacement lecturers were hired and it appears that succession planning is in place to replace retiring lecturers. The fact that selection of lecturers is on a competitive basis should ensure that the students are taught by the best available lecturers. However there needs to be an active culture of scientific research in the faculty with lecturers actively participating in conferences both in Lithuania and abroad. Therefore, as pointed out above, attendance at international scientific conferences and publication in international journals should be encouraged.

It should be pointed out that study programme staff are active in national activities related with students' professional creativity development and College's staff and students have been participating in LINPRA[9] project "ATVERK"– Ateities verslo komanda (ATVERK – future business team)[10] trainings and helped to implement in practice the business ideas of students in the centres of entrepreneurship and technical creation founded by the project partners. Also credits are given to staff for encouraging and supporting students participating in international students' competition like Formula Student.

Teaching staff of MTE study programme cooperates with partners participates in companies technicians professional development, e.g. by the request of UAB "Arginta Engineering" investigated the possibilities of development of professional competences and performed research works: Model of improvement of metalworkers professional competences in UAB Arginta Engineering. On the basis of the received results, measures were prepared for the development of metalworkers and technologists competences, including knowledge assessment tests which are successfully applied.[11] This kind of activity involves teaching staff in the last trends of industrial competences development, what helps renew and maintain study programme with the last standards.

Opportunities are provided for courses of professional development, scientific discussions, scientific-practical seminars, academic readings and international scientific conferences. While these initiatives are good, it is to be noted that most of the international study visits are very short (a few days only). Longer visits (1 months or longer) would give the participant time to absorb the latest technological developments and participate in the scientific activities in host institutions to the benefit of his/her own research on return to Lithuania.

Strengths

- Sufficient number of lecturers with doctoral qualification participating in the study programme, as well as lecturers with good technical background and practice taking apart in the programme, this allows good balance within theory and practice for students' skills development.
- Some teachers (in the meantime three of the staff) are PhD students. They have participated in mobility programs and College has kept their salary. This is highly commended.
- Lecturers are motivated and encouraging students for various students' professional creativity development activities.
- Lecturers closely cooperate with social partners and industry which helps continuous professional development.

Weaknesses

---

[9] LINPRA - The Engineering Industries Association of Lithuania, internet access: http://www.linpra.lt

[10] Project "ATVERK"- Future Business Team" No.VPI-2.2-ŠMM-07-K-03-028

[11] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 51, Vilnius, November 2014

- Foreign language skills for most of the lecturers should be improved to allow higher access of international students and staff mobility and for the ability to keep up-to-date with the latest trends in new technologies and materials.
- Insufficient participation of lecturers for longer term international visits (internships).

2.4. Facilities and learning resources

In Self-evaluation report it was stated that during the last period the College implemented a project subsidised by EU structural funds "Vilnius College of Technologies and Design, Studies Infrastructure Modernization"[12], by means of which reconstruction of the building of the Technical Faculty and renovation of laboratory equipment have been performed. (While reconstructing the building, the Technical Faculty was temporarily moved from Olandų Str. 16 to other buildings of the College, i.e. Antakalnio Str.54 and K. Kalinausko Str. 7). Building modernization works did not interfere with the study process.

The MTE study programme is implemented and study process is performed in 21 auditoriums and 16 laboratories. For study process, appropriate software is used and sufficient number of computers and programmes are available. Software in use for study process corresponds with current trends in the industry, e.g. EdgeCAM and SolidWorks[13] and allows students to obtain good and valuable practical skills needed for their future professional activities.

The Faculty supports students' professional development activities by providing all necessary facilities and consumables.

For Educational practices (internships) students have possibility to use classic metal working machinery, which helps to obtain basic knowledge and understanding of the technological process. For advanced use of metalworking equipment HAAS Fanuc CNC is used also CNC machines are available for the students training. Professional practice helps to develop student's skills, it also allows students to get acquainted with bigger variety of different types of machineries and models.

Various contracts for cooperation with the industry have been signed and implemented. Also students are free to choose any other company with the approval of the head of department.

During the visit it could be seen that facilities are outstanding and sufficient for studies process and practical skills development. The characteristics of infrastructure were not clearly stated in the Self-evaluation report, for example the overall area of the technical faculty, total number of students, etc. therefore it was difficult to evaluate average m^2 of the total area per student of the Technical Faculty, but during the site visit it was seen that infrastructure conforms to high standards and this criteria is fulfilled.

During the visit on site it has been recognized that from the all MTE specializations, infrastructure support by laboratories equipment for Mechatronics Systems of Technological Equipment specializations could be improved to keep the same standards as for other specializations of MTE. Purchase of equipment related with robotics, pneumatics (hydraulics), control and data acquisition equipment is recommended.

---

[12] 2007–2013 Cohesion Incentive Action Programme 2 Priority "Quality and Availability of Public Services: Health, Education and Social Infrastructure, VP3-2.2-ŠMM-14-V Measure: Modernisation and Development of Colleges Infrastructure, Project Vilnius College of Technologies and Design Infrastructure Modernization" Project No. VP3-2.2-ŠMM-14-V-01-007

[13] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 81, 82 Vilnius, November 2014

Use of e-learning (distance learning) facilities by staff should be more encouraged but all necessary means are provided for students and lecturers.

Faculty library is equipped and able to provide all necessary learning materials: textbooks, articles, journals and all necessary resources. The funds of the VCTD library comprise 31,744 titles and 146,954 copies of publications. For the aims of study programme Mechanical Technologies Engineering, there are 750 copies of 50 titles of specialized publications[14]. The library of the college offers students and teachers 6 subscribed data bases. College for research and studies activities subscribes universal data bases: EBSCO Publishing, Oxford Reference Online, Taylor & Francis Online Library. These databases are also are available for students' needs.

By the means of cooperation College obtained from other science and studies institution subscription of electronic books, 46 books are launched on the e-books site[15].

During the meeting with students the Expert team was informed that students have possibility to connect to e-learning sources of the College from home or other external locations (internet access points).

The Expert team is of the opinion that the facilities and resources provided are adequate for the study programme, but for the future development College will have to plan and allocate sufficient financing to keep maintain high standards for facilities.

Strengths

- High standards for library, laboratories, auditoriums, students team working and professional skills development places are maintained. Facilities are newly renovated and new laboratory equipment is installed by use of EU structural funds.
- High level premises for professional CNC machines operators training.
- Adequate learning resources are available in the library.
- Students have possibility to connect to e-learning sources from external internet access points.

Weaknesses

- MTE study programme is able to use very good laboratories, but comparing to high standards of the whole study programme, laboratory infrastructure, specialization related with Mechatronics skills training could be improved by introducing equipment and premises related with robotics, pneumatics (hydraulics), control and data acquisition equipment.

2.5. Study process and students' performance assessment

Students' admission to higher education institutions and their financing are regulated by The Republic of Lithuania Law on Higher Education and Research[16]. Students are admitted to the study programme following students' admission rules approved by the Order of the Republic of Lithuania Minister of Education and Science[17]. Students' have to compete for the state founded

[14] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 86, Vilnius, November 2014.
[15] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 89, Vilnius, November 2014.
[16] The Republic of Lithuania: Law on Higher Education and Research No.XI-242, April 30, 2009.
[17] The Republic of Lithuania Ministry of Education and Science: Order No.SR-40-11-501, 14-09-2006; On Admission to the State Higher Education Institutions, Order No. ISAK-1038, 31-05-2007 On the Number of

places and admission is organised and performed with the succession line of the best graduates from the secondary education institutions. Competition is based on scores in secondary school examinations, main criteria for study programme *Mechanical Technologies Engineering* are the following: estimation of the main subject – maturity exam result for Mathematics (leverage coefficient - 0,4); the second subject – maturity exam result for physics (leverage coefficient - 0,2); the third subject – Lithuanian language and literature (leverage coefficient – 0.2); the fourth subject – yearly mark for foreign language (leverage coefficient – 0.2) and since 2014 – yearly mark for one of the chosen subjects: History /Geography /Information Technology /Chemistry /Biology/ qualification exam (leverage coefficient – 0.2).

Admission concluded by the Association of Lithuanian Higher Education Institutions for Admission to Education Institutions (LAMA BPO).

State funded students of the MTE programme have shown good admission performance during last two years. Expert team also has recognised that for non-state funded places no minimum admission criterion by the Vilnius College of Technologies and Design was introduced.

The system for assessment of students' achievements[18] is relevant. Achievements are assessed following the description of the procedure for assessment of learning outcomes. The results of every subject reflect the outcomes of the whole study programme. Cumulative score calculation mainly is used. This helps to continuously monitor of students' studies performance.

The assessment of courses are based on a 10 point scale. The average leverage coefficient of the students' advance is 7,5 points. Average leverage coefficients of examination sessions in the first and the second courses (2013-2014 academic year) fluctuate from 7,3 up to 7,8 points. It has been observed, that lower averages of the study progress results usually happen in the 1st course (2012-2013 academic year), and higher – in the 2nd course (2013-2014 academic year). It also correlates with drop-out rates. Because of that not all students are properly prepared for the study programme and ready to study complicated material which requires much knowledge of the exact sciences. Higher drop-out is observed for the first studies year and it correlates with averages students advance points, which is lower for the first year.

Students are provided with the mobility possibilities, but participation rate should be improved. In 2012-2013 a.y. 1 student and in 2013-2014 a.y. 3 students went abroad to study according to Erasmus exchange programme. One of the possibility to encourage students mobility is to provide subjects related with profession in English language. It would help them to improve language skills and will make them more self-confident to participate in the mobility programmes.

After programme's significant changes in 2012 the first graduates will be released from MTE programme in 2015 June, but from the meeting with social partners it can be seen that MTE graduates will be highly demanded.

The drop-out rate of the MTE study programme is within reasonable limits and does not exceed 19%; more precise values will be available after the first graduation of the first generation of the specialists.

College provides and supports students for sport, cultural and professional development activities. Sports activities encourages healthy lifestyles. For students who prefers folk dance youth traditional dance ensemble "Sietuva" is available for self-realization. Students are provided with all necessary support for their professional developments, one of the latest

---

Students Admitted in 2007 to the State Higher Education and Research Institutions, Having General Doctorate Studies with Universities, according to Institutions, Study Modes, Fields and Funding.

[18] *The Description of the Procedure for Assessment of Learning Outcomes,* approved by VCTD Academic Council Meeting Minutes No.14-6, 23-06-009-06-23

activities – Formula Student. This kind of projects highly motivates students for knowledge seeking.

Strengths

- Organisation of the study process ensures the proper implementation of the study programme and achievement of learning outcomes.
- MTE students closely cooperates with industry during internships and professional development activities. It is not main condition for their futures success, but this is a good support for their future employability.

Weaknesses

- Low mobility of the students.

2.6. Programme management

The management, monitoring, responsibilities for decision making within the programme are allocated clearly and implemented within College internal system for management of quality of studies. One of the basic documents for quality management of the study programme is Quality Handbook.

College conducts students' and teachers' opinion polls and surveys which are performed with the aim to reveal their opinions on the quality of studies and to spread such information in the College[19]. Continuous survey is performed and feedback of students, staff, and social partners is collected.

In the Faculty level the highest self-government body is The Council of the Faculty. It can introduce new studies programmes, submit proposals to the Academic Council on realisation of study programmes and their quality assurance, assess the activity of the departments, quality of studies and applied research.

The executive level of Faculty activities is managed by the Dean of the Faculty, who assures the quality of studies organised in the Faculty, the quality of applied scientific research and takes care of the level of provided higher education. The administration body of the Faculty consists of the Dean, Vice-Dean, studies coordinators and the secretaries.

The operational level of the study programme management is the Study Programme Committee. This Committee is responsible for improvement and revisions of the programme, cooperation with the stakeholders, Department, Faculty. Social partners are members of this Committee. Formulation of study results and learning outcomes is also responsibility of the Committee.

The teachers are encouraged to take a part in the improvement of the study programme. The Study Programme Committee together with the teachers and social stakeholders analyses the emerging information following the trends in the industry and performs updates and corrections of the study programme.

Students' feedback is very important and valuable for study programme improvement. Students willingly express their opinion through the Student Representation (Student Union), and its representatives in the Study Programme Committee, the Faculty Council and the Academic Council. This kind of participation gives active feedback and information, but it is based on information provided by representatives' and sometimes it doesn't represent the whole picture. This feedback has to be supported by students' questionnaires. Correlation between the students'

[19] Vilnius College of Design and Technologies, study programme Mechanical Technologies Engineering Self-evaluation report, Paragraph 145, Vilnius, November 2014.

polls (questionnaires) and improvement of study programme, or how studies process was improved or changed based on information provided by the students was not clearly shown in Self-evaluation report. Also it has to be mentioned that students' poll's activity was not presented. It has to be noted that active students are able express their opinion, but systemic measures has to be applied to improve students' feedback about the study programme quality.

The lecturers of the study programme were mostly satisfied with the processes involved in the monitoring of the quality of the study programme.

During the site visit students' activity in all management bodies was clearly seen, students were active and happy for opportunity to express their opinion.

During the meeting with social partners it was clear that they are ready to contribute even more whereas currently the contact between administration, teaching staff and industry is based more on personal basis. This is also good but on other hand Faculty is limiting the sources of information. Therefore mechanism like periodical Business (Industrial) Advisory Panel between social partners and faculty staff could be implemented. It can be a forum where different opinions and information is provided and it would help to collect information systematically.

Strengths

- Structure of programme management is in place, all parties are involved in the study programme management and improvement.

Weaknesses

- Social partners are active, but more systematic communication means should be used to ensure precise and in-time information collection.
- Systematic approach of social partners – administration – teaching staff is needed. At the moment feedback is based on personal contacts and communication, this limiting available information and sources. Administration should develop system (mechanism) of periodical and systematic feedback collection.

III. RECOMMENDATIONS

1. Study programme has motivated lecturers. Staff should be encouraged to improve their foreign language communication skills in order to enable them to keep up to date with the latest technologies and trends in their field and increase their international mobility.
2. Effort should be made to encourage international mobility of both lecturers and students. Improvement of the professional field language skills of both staff and students is necessary to facilitate this, and will enable lecturers to deliver more subjects in foreign language, thus increasing the choice of subjects for incoming exchange students. Students' communication skills will improve by having lectures together with foreign exchange students.
3. While the study programme pays sufficient attention to the basic engineering subjects to ensure good engineering background, engineering practice requires good communication, team working skills and understanding of project management. However the study subject of Project management is not delivered in the study programme whereas Economics is given quite high attention with two subjects included in the programme: Economy Theory and Economy of Enterprises. It is recommended to have one subject related with business economics and maybe to introduce study subject Project Management in the study programme.
4. Mechatronics skill training equipment and premises should be improved to keep the same standards as other specializations of MTE. Purchase of equipment related with robotics, pneumatics (hydraulics), control and data acquisition is recommended.
5. While international mobility initiatives are good, it is to be noted that most of the international study visits by lecturers are very short (a few days only). Longer visits (1 months or longer) would give the participant time to absorb the latest technological developments and participate in the scientific activities in host institutions to the benefit of his/her own research on return to Lithuania.
6. Study programme has strong and active social partners willing to help. Administration should take advantage of this by engaging them more in roundtable discussions for information and knowledge gathering as well as attract funding. Mechanism like periodical Business (Industrial) Advisory Panel involving social partners and faculty staff events (meetings) could be implemented. It can be a forum where different opinions and information is provided and it will help to collect information systematically.

IV. EXAMPLES OF EXCELLENCE (GOOD PRACTICE)

Students' involvement in after class engineering and professional development activities.

At the mean time students of the Faculty have possibility participate in Formula Student project. Students are provided with all necessary support, this kind of projects highly motivates students for knowledge seeking and professional skills development.

Well organized, maintained and developed infrastructure for studies, self-learning and after class activities.

High standards for library, laboratories, auditoriums, students' team working and professional skills development places is maintained and kept. Facilities are newly renovated and new laboratory equipment are installed. This is good example of investments allocation and concentration.

V. SUMMARY

The stated aim of the study programme of *Mechanical Technologies Engineering* at the Vilnius College of Technologies and Design is to prepare for the labour market competitive, highly-qualified specialists of mechanical engineering able to work independently, apply the newest knowledge of technologies and solve professional problems in the area of mechanical engineering and production. Graduates are awarded the Professional Bachelor's degree in engineering after a study consisting of 180 ECTS credits. The study programme was significantly renewed 2012 according to 2007–2013 Human resources development programme 2 priority "Lifelong learning", VP1-2.2-ŠMM-07-K-01-090 project measure "Improving studies quality, enhancing internationality. The updated study programme in 2012 was evaluated by EVALAG agency (Germany), which is included into the register of. Independent experts gave positive assessment of the renewed study programme *Mechanical Technologies Engineering* and awarded it a certificate issued by the European Agency for Quality Assurance in Higher Education EVALAG and the right to mark the study programme with EVALAG quality mark.

The study programme after revision in 2012 is based on the learning outcomes, the ECTS concept and Dublin Descriptors.

Study programme *Mechanical Technologies Engineering* is registered as a new study programme (state code – 653H30002) and its implementation commenced since September 1, 2012 and this is the first international evaluation of the programme after significant programme update.

The learning outcomes of the programme of study are described in detail and stated in clear, non-technical form which can be understood by the general public. They are well defined, clearly stating the knowledge, awareness, abilities and skills which the graduate will be expected to possess on completion of the Bachelors programme. Learning outcome of an individual study subjects foresee attainment of necessary knowledge and skills to achieve certain results established in the study programme. They conform to the requirement for the qualification of the trained specialists established according to Level 6 of the Lithuanian Qualifications Framework and of the European Qualifications Framework for Lifelong Learning.

The name of the programme - *Mechanical Technologies Engineering* – is appropriate given the three specializations of the study programme (Repair of Automobiles Mechanical Systems, Repair Technology of technological Equipment and Mechatronics systems of Technological Equipment). The degree is awarded in the field of Mechanical Engineering which is the most appropriate of the classifications approved by the Ministry of Education

The Expert team found that the further programme improvements can be made because todays practice requires good communication and team working skills, this requires good understanding about the project itself and project management. However this knowledge is not delivered in the study programme, otherwise for Economics is given quite high attention with two subjects included in the programme: Economy Theory and Economy of Enterprises. It would be more appropriate to have one subject related with business economics and maybe to introduce Project Management as a separate subject in the study programme.

The Expert team also found that from the all study programme Mechanical Technologies Engineering specializations, infrastructure support by laboratories equipment for Mechatronics Systems of Technological Equipment specializations could be improved to keep the same standards as other specializations of MTE. Purchase of equipment related with robotics, pneumatics (hydraulics), control and data acquisition equipment is recommended.

It was also noticed by the Expert team that more engagement of lecturers' in the research in order to keep up with the latest trends in technology in their subject is needed. It also has to be pointed out that a lot of lecturers with PhD have part time position in the College so this limits their involvement in College research activities. It is also recommended that foreign language skills of lecturers should be improved to allow better access of international students and staff mobility and latest trends in new technologies and materials. Participation of lecturers for longer term international visits is also recommended.

Students are enthusiastic and are provided with all necessary support for their professional developments, for example, at one of their latest activities – Formula Student. This kind of projects highly motivates students for knowledge seeking.

The Expert team is of the opinion that graduates of *Mechanical Technologies Engineering* study programme will be highly demanded by the industry.

VI. GENERAL ASSESSMENT

The study programme *Mechanical Technologies Engineering* (state code – 653H30002) at Vilnius College of Technologies and Design 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	4
3.	Teaching staff	3
4.	Facilities and learning resources	4
5.	Study process and students' performance assessment	4
6.	Programme management	3
	Total:	**21**

*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:	Dr. Oluremi Ayotunde Olatunbosun
Grupės nariai: Team members:	Dr. Rynno Lohmus
	Dr. Bojan Dolšak
	Dr. Andrius Vilkauskas
	Dr. Vigantas Kumšlytis
	Mr. Justinas Staugaitis

Vertimas iš anglų kalbos

VILNIAUS TECHNOLOGIJŲ IR DIZAINO KOLEGIJOS PIMOSIOS PAKOPOS STUDIJŲ PROGRAMOS *MECHANINIŲ TECHNOLOGIJŲ INŽINERIJA* (VALSTYBINIS KODAS – 653H30002) 2015-03-16 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-53-8 IŠRAŠAS

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Klaipėdos valstybinės kolegijos studijų programa *Mechaninių technologijų inžinerija* (valstybinis kodas – 653H30002) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	4
3.	Personalas	3
4.	Materialieji ištekliai	4
5.	Studijų eiga ir jos vertinimas	4
6.	Programos vadyba	3
	Iš viso:	**21**

* 1 - Nepatenkinamai (yra esminių trūkumų, kuriuos būtina pašalinti)
2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)
3 - Gerai (sistemiškai plėtojama sritis, turi savitų bruožų)
4 - Labai gerai (sritis yra išskirtinė)

<...>

IV. SANTRAUKA

Vilniaus technologijų ir dizaino kolegijoje vykdomos studijų programos *Mechaninių technologijų inžinerija* (toliau – MTI)tikslas – darbo rinkai parengti konkurencingus, aukštos kvalifikacijos mechanikos inžinerijos specialistus, gebančius savarankiškai dirbti, taikyti naujausias technologines žinias ir spręsti profesines problemas mechanikos inžinerijos ir gamybos srityje. Absolventams, baigusiems 180 ECTS kreditų studijas, suteikiamas inžinerijos profesinis bakalauras. 2012 m. studijų programa buvo iš esmės atnaujinta pagal 2007–2013 m. Žmogiškųjų išteklių plėtros programos 2 prioriteto „Mokymasis visą gyvenimą“ VP1-2.2-ŠMM-07-K-01-090 projekto priemonę „Studijų kokybės gerinimas, tarptautiškumo didinimas“. 2012 m. atnaujintą studijų programą vertino į registrą įtraukta EVALAG agentūra (Vokietija). Nepriklausomi ekspertai teigiamai įvertino atnaujintą studijų programą *Mechaninių technologijų inžinerija* ir suteikė pažymėjimą, kurį išduoda Europos kokybės užtikrinimo aukštajame moksle agentūra EVALAG, ir teisę studijų programą ženklinti EVALAG kokybės ženklu.
Po 2012 m. atlikto atnaujinimo studijų programa yra pagrįsta studijų rezultatais, ECTS koncepcija ir Dublino aprašais.
Studijų programa *Mechaninių technologijų inžinerija* įregistruota kaip nauja studijų programa (valstybinis kodas – 653H30002) ir vykdoma nuo 2012 m. rugsėjo 1 d. ir tai yra pirmas iš esmės atnaujintos programos tarptautinis vertinimas.
Studijų programos studijų rezultatai aprašyti išsamiai, išdėstyti aiškiai, ne technine forma, tad gali suprasti ir plačioji visuomenė. Jie gerai apibrėžti, aiškiai nurodytos žinios, supratimas,

gebėjimai ir įgūdžiai, kuriuos, tikimasi, turės bakalauro programą baigęs absolventas. Atskirų studijų dalykų rezultatai numato siekti reikiamų žinių ir įgūdžių, norint pasiekti tam tikrus studijų programoje nustatytus rezultatus. Jie atitinka rengiamų specialistų kvalifikacijai keliamus reikalavimus, parengtus pagal Lietuvos kvalifikacijų sandaros ir Europos kvalifikacijų sąrangos mokymuisi visą gyvenimą 6 lygio kvalifikacijos reikalavimus.

Programos pavadinimas – *Mechaninių technologijų inžinerija* – yra tinkamas ir atspindi tris studijų programos specializacijas (Automobilių mechaninių sistemų remonto technologija, Technologijos įrenginių mechatroninės sistemos ir Technologijos įrenginių remonto technologija). Laipsnis suteikiamas mechanikos inžinerijos srityje, jis yra pats tinkamiausias iš klasifikacijų, kurias patvirtino Švietimo ir mokslo ministerija.

Ekspertų grupė nustatė, kad programą galima toliau tobulinti, nes šiandienos praktika reikalauja gerų bendravimo ir komandinio darbo įgūdžių, o tam reikia gerai suprasti patį projektą ir projekto valdymą. Tačiau šios žinios studijų programoje nėra suteikiamos, nors ekonomikai skiriama gana daug dėmesio, į programą įtraukti du dalykai: *Ekonomikos teorija* ir *Įmonių ekonomika*. Būtų tikslingiau numatyti vieną su verslo ekonomika susijusį dalyką ir galbūt į studijų programą įtraukti atskirą dalyką *Projektų valdymas*.

Ekspertų grupė nustatė, kad iš visų studijų programos *Mechaninių technologijų inžinerija* specializacijų reikėtų atnaujinti *Technologijos įrenginių mechatroninių sistemų* specializacijos laboratorijos įrangą, kad ji atitiktų tuos pačius standartus kaip ir kitos MTI specializacijos. Rekomenduojama įsigyti su robotika, pneumatika (hidraulika), valdymu ir duomenų įsigijimu susijusią įrangą.

Ekspertų grupė taip pat pastebėjo, kad dėstytojus reikia daugiau įtraukti į mokslinius tyrimus, kad jie neatsiliktų nuo naujausių technologijos srities tendencijų, kurių reikia dėstant dalyką. Būtina atkreipti dėmesį, kad daug mokslų daktaro laipsnį turinčių dėstytojų kolegijoje dirba ne visu etatu, o tai riboja jų dalyvavimą kolegijos mokslinių tyrimų veikloje. Taip pat rekomenduojama gerinti dėstytojų užsienio kalbos įgūdžius, kad būtų galima suteikti daugiau galimybių tarptautiniams studentams, užtikrinti personalo judumą ir galimybę stebėti naujausias naujų technologijų ir medžiagų tendencijas. Rekomenduojami ilgesni dėstytojų tarptautiniai vizitai.

Studentai yra patenkinti, jiems suteikiama visa reikalinga parama siekiant profesinio tobulėjimo, pavyzdžiui, viena iš naujausių veiklų – „Studentiškos formulės“ projektas. Tokio tipo projektai labai motyvuoja studentus siekti žinių.

Ekspertų grupė mano, kad baigusieji studijų programą *Mechaninių technologijų inžinerija* turės didelę paklausą pramonėje.
<…>

III. REKOMENDACIJOS

1. Studijų programą vykdantys dėstytojai yra motyvuoti. Būtina skatinti dėstytojus tobulinti bendravimo įgūdžius užsienio kalba, kad jie galėtų stebėti naujausias savo srities technologijas ir tendencijas, aktyvinti tarptautinį judumą.
2. Reikia imtis veiksmų dėstytojų ir studentų tarptautiniam judumui skatinti. Tam būtina tobulinti dėstytojų ir studentų profesinės srities kalbos įgūdžius, tai leistų dėstytojams daugiau dalykų dėstyti užsienio kalba ir tokiu būdu padidintų studentų, atvykusių pagal mainų programas, dalykų pasirinkimą. Studentų bendravimo įgūdžiai pagerės, jei jie turės bendras paskaitas su užsienio studentais.
3. Studijų programoje pakankamai dėmesio skiriama pagrindiniams inžinerijos dalykams ir geriems inžinerijos pagrindams užtikrinti, tačiau inžinerijos praktika reikalauja ir gerų

bendravimo, komandinio darbo įgūdžių bei projektų valdymo supratimo. Studijų dalykas „Projektų valdymas“ į studijų programą nėra įtrauktas, o ekonomikai skiriama gana daug dėmesio ir į programą įtraukti du dalykai: *Ekonomikos teorija* ir *Įmonių ekonomika*. Rekomenduojama dėstyti vieną su verslo ekonomika susijusį dalyką ir galbūt į studijų programą įtraukti dalyką *Projektų valdymas*.

4. Reikėtų gerinti *Mechatronikos* įgūdžiams ugdyti skirtą įrangą ir patalpas, siekiant išlaikyti tuos pačius standartus kaip ir kitų mechaninių technologijų inžinerijos (toliau – MTI) specializacijų. Rekomenduojama įsigyti su robotika, pneumatika (hidraulika), valdymu ir duomenų įsigijimu susijusią įrangą.
5. Tarptautinio judumo iniciatyvos yra geros, tačiau reikia pažymėti, kad daugumos dėstytojų tarptautinių studijų vizitai yra labai trumpi (tik keletas dienų). Ilgi vizitai (1 mėnuo ar ilgiau) suteiktų galimybę skirti daugiau laiko naujausioms technologinėms naujovėms perprasti ir dalyvauti mokslinėje veikloje priimančiose institucijose, o tai būtų naudinga mokslinių tyrimų veiklai grįžus į Lietuvą.
6. Studijų programa gali pasigirti stipriais ir aktyviais bei norinčiais padėti socialiniais partneriais. Vadovybė turėtų tuo pasinaudoti ir juos aktyviau įtraukti į apskritojo stalo diskusijas informacijai ir žinioms rinkti, taip pat finansavimui pritraukti. Galėtų būti sukurta periodinė Verslo (gamybinė) patariamoji grupė, kurioje dalyvautų socialiniai partneriai ir fakulteto darbuotojai ir būtų organizuojami renginiai (susitikimai). Tai galėtų būti forumas, kur būtų pateikiamos įvairios nuomonės ir informacija, o tai užtikrintų sistemingą informacijos rinkimą.

<…>

Paslaugos teikėjas patvirtina, jog yra susipažinęs su Lietuvos Respublikos baudžiamojo kodekso 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

Vertėjos rekvizitai (vardas, pavardė, parašas)