

STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

**KAUNO TECHNOLOGIJOS UNIVERSITETO**

**STUDIJŲ PROGRAMOS *MECHANIKOS INŽINERIJA (valstybinis kodas – 621H30001)***

**VERTINIMO** **IŠVADOS**

––––––––––––––––––––––––––––––

**EVALUATION REPORT**

**OF *MECHANICAL ENGINEERING* (*state code –***

***621H30001*)**

**STUDY PROGRAMME**

**at** **KAUNAS UNIVERSITY OF TECHNOLOGY**

|  |
| --- |
| 1. **Prof. dr. Olav Aarna (team leader),** *academic,*
2. **Prof. dr. Hartmut Ulrich,** *academic,*
3. **Prof. dr. Jolanta, Janutėnienė,** *academic,*
4. **Prof. dr. Mikael Enelund,** *academic,*
5. **Dr. Vaidas Liesionis,** *representative of social partners’,*
6. **Mr. Eduardas Gvozdas,** *students’ representative*.

**Evaluation coordinator –****Ms. Natalja Bogdanova** |

Išvados parengtos anglų kalba

Report language – English

**DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ**

|  |  |
| --- | --- |
| Studijų programos pavadinimas  | ***Mechanikos inžinerija*** |
| Valstybinis kodas | 621H30001 |
| Studijų sritis | Technologijos mokslai |
| Studijų kryptis | Mechanikos 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 | Mechanikos inžinerijos bakalauro laipsnis |
| Studijų programos įregistravimo data  | 2007-02-19 |

–––––––––––––––––––––––––––––––

**INFORMATION ON EVALUATED STUDY PROGRAMME**

|  |  |
| --- | --- |
| Title of the study programme | ***Mechanical Engineering***  |
| State code | 621H30001 |
| Study area | Technology Sciences |
| Study field | Mechanical 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 Mechanics Engineering |
| Date of registration of the study programme | 19-02-2007 |

|  |  |
| --- | --- |
| © | Studijų kokybės vertinimo centras |
| The Centre for Quality Assessment in Higher Education |

**CONTENTS**

[I. INTRODUCTION 4](#_Toc417631778)

[1.1. Background of the evaluation process 4](#_Toc417631779)

[1.2. General 4](#_Toc417631780)

[1.3. Background of the HEI/Faculty/Study field/ Additional information 4](#_Toc417631781)

[1.4. The Review Team 5](#_Toc417631782)

[II. PROGRAMME ANALYSIS 6](#_Toc417631783)

[2.1. Programme aims and learning outcomes 6](#_Toc417631784)

[2.2. Curriculum design 8](#_Toc417631785)

[2.3. Teaching staff 9](#_Toc417631786)

[2.4. Facilities and learning resources 11](#_Toc417631787)

[2.5. Study process and students‘ performance assessment 11](#_Toc417631788)

[2.6. Programme management 13](#_Toc417631789)

III. RECOMMENDATIONS 14

[IV. SUMMARY 15](#_Toc417631790)

[V. GENERAL ASSESSMENT 16](#_Toc422400601)

# **I.** **INTRODUCTION**

## 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 byOrder 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).

## General

The Application documentation submitted by the HEI follows the outline recommended by the SKVC. No additional documents have been provided by the HEI before, during or after the site-visit.

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

Kaunas University of Technology (KTU) has evolved from the higher education courses established in 1920. KTU consists of 9 faculties, 10 research institutes, library and departments of administration and support. Structure and activities of the KTU are oriented towards studies and research in the area of engineering, sciences and technologies. KTU offers study programmes in six main fields of study: engineering, physical and social sciences, arts, humanities and biomedicine on Bachelor’s, Master’s, and Doctoral level. The KTU is running 151 study programmes all together:  64 Bachelor's programmes, 69 Master's programmes, and 17 Doctoral programmes, incl. 39 programmes are offered in English.

KTU is one of the leading universities in Lithuania engaged in scientific research and studies in the field of engineering and technology. KTU is also the founder of two science and technology parks – "Santaka" and "Nemunas".

The Master’s study programme in Mechanical Engineering (ME) under review is carried out at the Faculty of Mechanical Engineering and Design. The first evaluation of this programme was conducted in 2008 by the team of Lithuanian experts. The expert team recommended “to revise and optimise number of specialisations; to increase usage of scientific laboratories, especially for projects of master students; to improve entrepreneurship skills of students” (SER, p.4). The programme was accredited for 6 years. After previous external evaluation several changes have been made in the programme, incl. the aims, structure, the programme curriculum and the content of subjects, procedure of preparation and defence of the final theses.

The self-evaluation report (SER) for the present evaluation was prepared by a self-evaluation team appointed by the order of the Rector. The self-evaluation team consisted of five professors, one student and one representative of social partners. The team was chaired by the programme manager.

## 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 *24th February 2015.*

|  |
| --- |
| 1. **Prof. dr. Olav Aarna (team leader),** *Member of the Management Board and adviser of Estonian Qualification Authority, Vice-Rector for Research at Estonian Business School, Estonia*.
2. **Prof. dr. Hartmut Ulrich,** *Professor for Mechatronics and Fluid Power Technology, Institute for Mechanical Engineering, University of Applied Sciences Ruhrwest, Germany.*
3. **Prof. dr. Jolanta Janutėnienė,** *Head of the Dep. of Mechanical Engineering, Faculty of Sea Mechanics, Klaipėda University, Lithuania.*
4. **Prof. dr. Mikael Enelund,** *Professor at the Department of Applied Mechanics, Chalmers University of Technology, Sweden.*
5. **Dr.****Vaidas Liesionis,** *Marketing Director at Machinery plant “Astra” AB, Lithuania.*
6. **Mr. Eduardas Gvozdas,** *student of Vilnius University study programmes Laser Physics and Optical Technologies, International Business Economics and Management*.

**Evaluation coordinator Ms. Natalja Bogdanova** |

# **PROGRAMME ANALYSIS**

## 2.1. Programme aims and learning outcomes

 The programme aims and learning outcomes (LOs) are based on the academic and professional requirements and the needs of the labour market. The programme developers have used the requirements of the EUR-ACE standards for the second cycle engineering degrees as a starting point for defining the programme LOs. According to this standard the programme LOs are grouped in six categories: knowledge and understanding, engineering analysis, engineering design, investigations, engineering practice, transferable skills. Information about the programme is available on the KTU web page: [http://ktu.edu/en/programmes/M/Technological+Sciences/Mechanical+Engineering/](http://ktu.edu/en/programmes/M/Technological%2BSciences/Mechanical%2BEngineering/)

The main focus of the programme is on the design and development of mechanical systems. The main aim of the programme is to develop creativeness and knowledge of modern mechanical engineering, abilities of research, analysis and creation of innovative mechanical systems (SER, p.5). The main aim is decomposed into to five competences:

* theoretical knowledge of innovative mechanical engineering and technologies;
* analysis and solving sophisticated problems of mechanical engineering;
* theoretical and experimental research;
* development and implementation of innovative designs and projects;
* solving engineering problems applying theoretical knowledge and understanding.

The programme aims are clear, related to the KTU mission and main strategic objectives.

 Most programme LOs are described in generic formulations from the EUR-ACE standard. Only LOs of the category “Knowledge and understanding” (A1, A2, A3) are related with the ME context. Other LOs of the programme (B4, C3, D1, D2, D3, E1, E4, F2, F3) are fairly general (SER, p.6-8). For example, B4: “Is able to process theoretical and technical information, analyse, assess and systemize, integrate information from different areas for the application in engineering practice” (SER, p. 7), or D2: “Is able to plan and perform analytical, modelling or experimental research, to process and interpret data of experimental, analytical research or analysis of practical cases and draw conclusions and recommendations” (SER, p.7) do not have any relation to the context of ME and can be used for any study programme in engineering. The review team recommends to introduce the ME context into the programme LOs.

Another general problem is integrating several independent LOs into a single LO. For instance, D1: “Is able to obtain, perceive, assess and process the necessary for engineering activities data from technical and scientific literature, data bases and other information sources. Is able to design, conduct analytical, modelling and experimental investigations, assess the results, draw and present conclusions” (SER, p.7) contains two distinctive LOs, which definitely need different approach to their assessment. Another but similar example is A2: ”Has integrated knowledge of computer-aided and experimental methods of research and application of modern materials and technologies, understanding of the methodologies applied for development of innovative products and processes, the methods of integrated computer aided design and manufacture, possibilities and limitations of integrated engineering systems” (SER, p.6). Therefore it is recommended to decompose such LOs into units, which can be assessed using the same methods and assessment criteria. This will give a clearer description of what a student is expected to know, understand and be able to do upon graduation.

It is recommended to revise the programme LOs introducing the ME context, reflecting also the LOs of elective subjects, presenting the programme LOs in assessable units and following the principle of constructive alignment of programme aims, programme LOs, module/subject LOs, methods and criteria for students’ assessment.

The name of the programme, the content and the qualification offered are compatible with each other. However, the LOs of the programme need to be revised, introducing the ME context, ensuring coverage of all programme LOs by subjects and following the principle of constructive alignment.

In the SER (p.17) it is declared, that only one Master’s programme in ME is offered at KTU. However, a formally identical programme is offered by the Faculty of Technologies and Business in Panevėžys. These programmes have identical aims and LOs, although their specialization modules are different. The expert group recommends to develop two separate Master’s programmes with clearly defined profiles of graduates and make them also available on the KTU website.

Graduates of the programme are employed by different engineering companies in Lithuania, the number of which is about 2000. The demand for engineering personnel is increasing by 2-4% per year.

## 2.2. Curriculum design

The structure of the curriculum corresponds to general requirements of “Description of the general requirements for master's degree programmes” (2010, Nr. V- 826). The volume of the programme is 120 ECTS credits or 4 semesters, 30 ECTS each. The main subjects cover 66 ECTS credits, while the volume of students’ individual work amount to 60-70 % of the volume of each subject.

The content of subjects is consistent with the type and level of the studies.

The structure of the programme is clear. The study programme consists of compulsory subjects and 4 elective subjects groups (30 ECTS each).

After previous evaluation in 2008 the programme has been revised and formally has no specialisations (SER, Table 2.4, p.27). The students have the possibility to choose an elective subjects module from the following list:

* Applied Computational Mechanics;
* Design of Mechanical Systems;
* Materials Engineering;
* Production Technology.

Most of the students choose the module Design of Mechanical Systems.

The content of the programme reflects the latest achievements in the field of ME. The subjects are arranged in a logical sequence; the topics covered do not overlap. Most of subjects are based on up-to-date research findings and industrial practice. Links between the LOs of subjects and the programme LOs are presented in Table 2.3 (SER. p.11). However, the connection between the programme LOs and the LOs of modules/subjects is weak, and marking in this table is not always coherent with the LOs of subjects. For example, LO C3 ”... is able to make proper solutions considering technical, aesthetic, economical, green engineering and sustainable development aspects of a product under development, economical factors and intended exploitation conditions” is marked as covered by subjects: Adaptive Mechatronic Systems, High Temperature Materials, Integrated CAD/CAE/CAM Systems, Computer-Aided Design Systems 1. However, the LOs of these subjects do not contain any reference to the keywords in C3. Another example is the LO E4 “… has awareness of ethical, juridical and commercial aspects of engineering activities”. This LO is marked as covered by subjects: Control of Electromechanical System in Technological Processes, Physical Metallurgy, Modelling of Robotic Cells and Systems, but the LOs of these subjects, again, do not contain any reference to the keywords in E4. The content and methods of the subjects are appropriate but not balanced with study programme learning outcomes.

The programme LOs do not reflect the LOs of elective subjects’ module, e.g. the LOs of Theory of Elasticity and Plasticity, Theory of Castings Processes and all subjects of the module in Materials Engineering. Some subject descriptions, e.g. Experimental Mechanics, Theory of Elasticity and Plasticity, Computational Mechanics, and Computer Integrated Manufacturing do not include LOs at all. The LOs of some subjects (Mechanical Vibrations; Robotics) are referring to subject knowledge only. Moreover, not all elective modules are available in English, although it is stated, that the programme is available for foreign students.

Definition of the expected LOs for the final degree project is problematic too, because they are identical to the Programme LOs. It is unrealistic and not necessary to achieve all 21 LOs of the programme in the framework of the final degree project as declared in the SER (Table 2.3). On the other hand, description of the Final Degree Project module (Annex 3.1) formulates only 3 LOs related to research and development in ME. One of them: “The student is able to identify products properties, generate ideas, develop concept, identify and analyse mechanical engineering problems in the context of sustainable development, formulate engineering tasks distinguishing priorities, combine effective technologies and modern materials in new projects, creatively integrate knowledge of some subjects acting in global multicultural environment and creating new product” is obviously difficult to achieve and assess. Therefore, it is recommended to develop a realistic set of LOs for the final degree project to make them achievable and assessable.

One more general problem is related to the verbs used in defining the LOs on module/subject level. Quite often they are of passive nature, e.g. “have …”, which makes it difficult to assess the achievement of these LOs. The expert group recommends the use of active verbs from the vocabulary of Bloom’s taxonomy.

## 2.3. Teaching staff

The structure, qualification and composition of the programme academic staff meet legal requirements. Selection and recruitment of teachers is conducted according to the Law on Sciences and Studies of the Republic of Lithuania. The qualification requirements and the procedure for appointment of teachers and researchers at are defined in the “Description of procedure for lecturers and researchers’ certification and competition for their position” approved by the KTU Senate.

The number of teachers is sufficient to support achievement of the programme LOs. The programme is delivered by 11 professors, 16 associated professors and 4 lecturers. The average age of teachers in the programme is 50, with relatively favourable distribution between the ranks: 60 for professors, 42 for associate professors and 35 for lecturers. During the last 5 years 4 teachers, who successfully defended their doctoral thesis have been employed by the Department of Mechanical Engineering. Two of them are involved in the programme. The rotation of the staff ensures appropriate delivery of the programme.

 Most of teachers have compiled course textbooks, are involved in research in ME, and regularly participate in international scientific conferences. Half of their publications are in journals indexed by the ISI Web of Science. During the last 5 years members of the teaching staff have prepared more than 30 textbooks and other study materials, incl. e-materials. Most of them are used in the Bachelor’s programme in ME.

Meetings with teachers and programme administration revealed that elections and rewarding of teaching staff is based mainly on their scientific merit. The review team recommends consider awarding also excellence in teaching.

During the period under review 5 lecturers from the Department of Mechanical Engineering have participated in the Erasmus exchange programme. More active participation in the Erasmus exchange programme need to be encouraged.

Research carried out in the Faculty of Mechanical Engineering and Design is directly related to the programme. Teachers of the Department of Mechanical Engineering actively participate in research project (about 6 projects per years). During the period under review they participate in the projects which have been financed by the Research Council of Lithuania (LMT), the Agency for Science Innovation and Technology (MITA), the EU Framework 7 Programme, and other agencies (SER, p.15).

The teaching staff CVs and the record of their academic activities proves that the qualification of the teaching staff is adequate to support achievement of the programme LOs.

Meeting with teachers revealed that they are not aware of the relations between the programme LOs, the subject LOs, and the assessment methods and criteria. Therefore it is recommended to train teachers in the full implementation of the LOs based approach referred to as the constructive alignment, incl. aligning the subject LOs and their assessment with the programme aims and LOs.

## 2.4. Facilities and learning resources

The premises for studies (auditoria, libraries) are adequate both in size and quality. All auditoria are renovated and equipped with stationary multimedia equipment. The laboratories used for the programme include: the Laboratory of Strength of Materials, the Laboratory of Manufacturing Technologies, the Laboratory of Rapid Prototyping, the Laboratory of CNC Processing Equipment, and specialized laboratories of the Institute of Mechatronics.

The students have the possibility to use new equipment for 3D prototyping and rapid tooling, equipment for materials analysis and mechanical testing, equipment for vibro-diagnostics, etc. The KTU has licenses for specialised software (SolidWorks, Autodesk, MSC, EdgeCAM), which is extensively used for solving different problems of ME.

During the last five years new laboratory equipment has been obtained (3D prototyping and rapid tooling equipment, equipment for materials analysis (hardness testers, microscopes, profilometers, SER (p.17)). Master’s students are expected to carry out research and have experience with the latest research equipment. However, some equipment in the Laboratory of Strength of Materials and in the Laboratory of Manufacturing Technologies is morally outdated. Fortunately, the students have free access to the laboratories at the Santaka Science and Technology Park to carry out their research projects, incl. the final degree project.

The programme study materials are adequate and accessible. The students have access to the following electronic data bases: Emerald Engineering e-Journals Collection; ScienceDirect; eBooks on EBSCOhost, Springer LINK E-Books, Oxford Journals, SAGE, e-books DB Ebrary, etc. Electronic library resources are also available for the students.

## 2.5. Study process and students‘ performance assessment

The programme is offered in full-time mode with two parallel streams of students in Lithuanian and in English. Admission to the programme meets the rules and procedures set by the KTU Senate. Only candidates having Bachelor’s degree in the relevant field of study are admitted.

The number of students admitted to the state financed study places decreased from 31 in 2009 to 16 in 2014. At the same time 13-16 students were admitted to the self-financed study places in 2013-2014.

The students participate in basic and applied research. In most cases this is related to their final degree projects. Students also participate in the activities of the Students Scientific Association and conferences organised at the KTU (e.g. conferences for young scientists in Industrial Engineering, Mechatronics for High-Tech Devices, and international scientific conference *Mechanika*), and publish their papers in scientific journals (e.g. *Mechanika*).

Students should be encouraged to participate more actively in scientific conferences and in the programme Promotion of Students’ Scientific Activities. As far as most of the students are working at least part-time, participation in research projects offered by such programmes is a perfect way to receive extra scholarships.

The quality of final degree projects of the programme is satisfactory. In some occasions final degree project has also been prepared in English. The expert team recommended students to write their final theses in foreign language. The students agreed with the recommendation of the expert team.

Students from Lithuanian and English streams participated in the meeting. Although Lithuanian students are encouraged to select courses offered in English, it turned out that they met each other for the first time during their study period. The foreign students are not satisfied with studies in the evenings. They expressed the wish to study daytime. Students mentioned also that not all elective modules are available in English. Lithuanian students would like more subjects delivered in English. The students would also like to have more laboratory practice and involvement in research instead of extensive lecturing.

The Faculty of Mechanical Engineering and Design has 23 ERASMUS agreements with international partners. International mobility of students is satisfactory. During the period 2009-2014 13 students of the programme participated in Erasmus exchange and 27 international students took some subjects of the programme. Nevertheless, it is recommended to encourage international mobility of students.

The drop-out rate from the programme is high. The ratio of students admitted and graduated is changing from 0.3 in 2009 to 0.93 in 2011. During the period of 2009 – 2014 the average drop out was about 39%. Although the students have a possibility to follow individual study plan, the main reason for high drop-out rate is related to difficulties in combining full-time studies and work. This was mentioned repeatedly at the meetings with the programme administrators, teachers and students. The expert team has doubts about the real volume of students’ work compared with the number of ECTS credits awarded. It is recommended to consider offering the programme in part-time mode.

The competence of programme graduates corresponds to the expectations of the labour market: “None of the programme graduates have ever registered as unemployed” (SER, p.26). The same was confirmed at the meeting with programme graduates and employers.

## 2.6. Programme management

The overall administration and quality assurance of study programmes at KTU is a responsibility of the vice-rector for studies. The programme in ME is managed by the Study Program Committee of the Faculty of Mechanical Engineering and Design involving 11 members, incl. 3 students and 3 representatives of employers. The committee cooperates with the Studies and Academic Culture Committee of the KTU Senate and has a coordinator of the programme from the Department of Mechanical Engineering. Changes to the programme are approved by the Faculty Council.

The Programme Committee manages 15 Bachelor’s and 14 Master’s programmes in the field of ME and design. However, such committee cannot have detailed overview about the needs of all programmes belonging to different branches of engineering and technology ([Textile Engineering](http://ktu.edu/en/programme/m/textile-engineering), [Fashion Engineering](http://ktu.edu/en/programme/m/fashion-engineering), [Nuclear Energy](http://ktu.edu/en/programme/m/nuclear-energy) etc.). The evaluation team recommends establish a separate programme committee for the programme under review, involving at least one student and one representative of employers.

Information on the implementation of the programme is regularly collected and analysed. The programme content is regularly reviewed. Changes to the modules and subjects are discussed and approved by the Faculty Council. Stakeholder’s feedback system at KTU is based on periodical surveys. Students, graduates, teachers and employers are periodically asked to evaluate programmes, subjects, and others aspects of academic life.

Students are aware of the evaluation process. However, their participation rate in the surveys is relatively low. On the other hand, the students are not informed about the results of these surveys. Therefore, it is recommended to establish a full feedback loop concerning the programme evaluation process.

Relations of the faculty with the social partners are close and productive. The social partners are satisfied with the programme graduates. They also emphasised increasing need for ME specialists in Kaunas region and in Lithuania.

The recommendations from previous external evaluation have been used for the improvement of the programme. The programme has been revised and in general meets the requirements for the Master’s level programmes in engineering. The methodology for conducting the final degree projects has been improved. The programme does not have explicit specialisations, but the students have extensive possibilities for choosing elective subjects.

The review team recommends KTU to develop two separate Master’s programmes in ME with clearly defined identity – one offered by the Faculty of Mechanical Engineering and Design in Kaunas, and another offered by the Faculty of Technologies and Business in Panevėžys.

**III. RECOMMENDATIONS**

###### Revise the curriculum to implement the principle of constructive alignment of the programme learning outcomes (LOs), module or subject LOs, and students’ assessment. Introduce the mechanical engineering context into the programme LOs. Ensure that all programme LOs are covered by module or subject LOs. Use active verbs in defining the LOs.

###### Revise the LOs of the final degree project to make them achievable and assessable.

###### Operationalise the development of transversal competences (teamwork, foreign language competence etc.) throughout the programme using different learning methods.

###### Train teaching staff in LOs approach for coherent implementation of the constructive alignment principle.

###### Consider awarding excellence in teaching.

###### Consider introducing part-time mode of studies for students who are working.

###### Use more research oriented equipment for students’ laboratory works and for preparing final degree projects.

###### Promote the development of international learning environment and possibilities for Lithuanian and English speaking students to study together. Encourage students writing final theses in foreign language.

###### Establish a separate Programme Committee, involving representatives of teaching staff, students and employers.

###### Develop two separate Master’s programmes in ME with clearly defined identity – one offered by the Faculty of Mechanical Engineering and Design in Kaunas, and another offered by the Faculty of Technologies and Business in Panevėžys.

# **IV. SUMMARY**

Master’s programme in mechanical engineering is offered by the Faculty of Mechanical Engineering and Design at Kaunas University of Technology (KTU). The graduates of the programme are well appreciated by the Lithuanian industry. Similar study programme with identical learning outcomes (LOs) is offered by the Faculty of Technologies and Business of KTU in Panevėžys, thus, creating unnecessary competition within the institution.

The programme meets general requirements for the Master’s programmes in engineering. The programme LOs are in correspondence with the with the EUR-ACE standard for the second cycle study programmes in engineering. However, most of the programme’ LOs do not reflect the mechanical engineering context and not all of them are covered by the subjects’ LOs. As a result, the connection between the programme LOs and the LOs of subjects is weak and a clear link between the programme LOs, module or subject LOs, and students’ assessment is missing.

The scientific competence of teaching staff is good. They participate actively in research and write textbooks.

The study materials, library resources, and software for numerical analysis are appropriate for Master’s studies in ME. However, more research oriented equipment is needed for the laboratory works and for preparing final degree projects.

The programme is offered in Lithuanian and English in separate study groups. Teaching staff of the programme is ready to teach in English. Therefore KTU is invited to create international learning environment, particularly enabling the students of both streams to learn together and work in international teams.

The study programme committee is responsible for 15 Bachelor’s programmes and 14 Master’s programmes in the field of mechanical engineering and design. However, management of the study programme under review needs to be direct and specific, involving all relevant stakeholders. Therefore it is necessary to establish a separate programme committee for the programme. Moreover, the existence of two formally identical programmes offered by the Faculty of Mechanical Engineering and Design in Kaunas, and the Faculty of Technologies and Business in Panevėžys inside the KTU is confusing. Therefore it is recommended to clearly separate these two programmes.

**V. GENERAL ASSESSMENT**

The study programme *Mechanical engineering* (state code – 621H30001) at Kaunas University of Technology 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  | 2 |
| 2. | Curriculum design | 2 |
| 3. | Teaching staff | 3 |
| 4. | Facilities and learning resources  | 3 |
| 5. | Study process and students’ performance assessment  | 3 |
| 6. | Programme management  | 3 |
|   | **Total:**  | **16** |

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

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

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

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

|  |  |
| --- | --- |
| Grupės vadovas:Team leader: | Prof. dr. Olav Aarna |
| Grupės nariai:Team members: | Prof. dr. Hartmut Ulrich |
|  | Prof. dr. Jolanta Janutėnienė |
|  | Prof. dr. Mikael Enelund |
|  | Dr. Vaidas Liesionis |
|  | Mr. Eduardas Gvozdas |