STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Kauno technologijos universiteto

TECHNOLOGIJŲ VADYBA PROGRAMOS (621H77004) VERTINIMO IŠVADOS

EVALUATION REPORT OF *TECHNOLOGY MANAGMENT* (621H77004) STUDY PROGRAMME

at Kaunas University of Technology

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Išvados parengtos anglų kalba
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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Technologijų vadyba***
Valstybinis kodas	621H77004
Studijų sritis	Technologijos mokslai
Studijų kryptis	Gamybos inžinerija
Studijų programos rūšis	universitetinės
Studijų pakopa	antroji
Studijų forma (trukmė metais)	nuolatinė (2)
Studijų programos apimtis kreditais	120
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	gamybos inžinerijos magistras
Studijų programos įregistravimo data	2009 04 04

INFORMATION ON ASSESSED STUDY PROGRAMME

Name of the study programme	***Technology Management***
State code	621H77004
Study area	technological sciences
Study field	production and manufacturing engineering
Kind of the study programme	university studies
Level of studies	second
Study mode (length in years)	Full-time (2)
Scope of the study programme in credits	120
Degree and (or) professional qualifications awarded	Master of Production and Manufacturing Engineering
Date of registration of the study programme	04 of May 2009

CONTENTS

I. INTRODUCTION

Kaunas University of Technology which got the start from Higher Courses, established in 1920, in Kaunas, is the University with deepest traditions of technological sciences in Lithuania. The university has 11000 students (7 years ago the number of students was about 14000), this number has decreased due to emigration, birth rate, etc. At present the University provides 29 first cycle programmes of technological sciences and 34 second cycle programmes of technological sciences. The second cycle study programme *Technology Management* (621H77004) (further *TM*) is organized by *International Studies Centre* (further –*ISC*) which is a strategic science and study unit of Kaunas University of Technology (further *KTU*) with a status of the University faculty. Programme master students are prepared by the joint team of university teachers from *ISC*, faculties of Mechanical Engineering and Mechatronics, Economics and Management and Chemical Technology.

The analyzed *TM* programme of the area of Technological sciences in the study field of Industrial Engineering was registered in the register of study and educational programmes by the Order No. 928 of 4 May 2009 of the Minister of Education and Science of Lithuanian Republic.

This Evaluation Report of the master programme Technology Management is based on the analysis of the Self-evaluation Report (SER) prepared by the programme team and on the discussions and observations made during the visit at Kaunas University of Technology on 3 October, 2012.

The evaluation expert team would like to thank all participants of the evaluation process for the information, constructive cooperation and support during the evaluation process.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

In Lithuania, besides the programme *Technology Management*, organized by the ISC of KTU, there are more programmes in the study field of Industrial Engineering and Management which are presented in 3 universities: Kaunas University of Technology (*KTU*, faculty of Mechanical Engineering and Mechatronics) – *Industrial Engineering and Management*, *Manufacturing Engineering*, Klaipeda's university (*KU*) – *Technology Control*, and Vilnius Gediminas Technical University (*VGTU*) – *Industrial Engineering*, *Industrial Engineering and Innovation Management*. Course units of similar content compile about 65 % of these programmes. Such situation enables students to migrate; on the other hand, appropriate competition among the programmes takes place as well. The management has clear vision regarding the programme aims and they focus TM instead of traditional technologies onto new technologies (micro and nanotech). The programme helps Lithuanian industry to take a step in innovation and move from being a "reverse engineer" to one who creates new products based on new technologies. This ambition is in right direction.

The programme belongs to the Technological science study area, and its aims are defined in SER. The key learning outcomes are defined in SER according to a special link matrix used in KTU based on the EUR-ACE Framework Standards for the Accreditation of Engineering Programmes (further on – Framework Standards). It is to be mentioned here, that there are some deviations in the link matrix titles compared with the Framework Standards: 1 of the 6 the original Programme Outcome of accredited engineering degree programmes title "Engineering Practice" has been changed into "Engineering Activities". Such looseness is

risky for interpretation of the original content of the Framework Standards' outcome by actual lowering requirements for practical competences.

The programme aims and learning outcomes are publicly accessible at the AIKOS (open IT platform for vocational information, counseling and guidance) web-site, as well as at the KTU web-site and other information channels.

The programme aims and learning outcomes are based on the professional requirements, and there is a high demand for such type of specialists on the labour market. Further expansion of basic competences, to other engineering fields, like IT, energy and electronics would be reasonable by introducing either in form of specializations or elective/free studies into *TM* programme.

Programme provides full time studies in English. It is aimed at expansion the student's competence acquired in the first study cycle. It is indicated, that persons who had finished the first cycle studies of university programmes and had been awarded a bachelor qualification degree of technological and physical sciences can be admitted to second cycle programme *Technology Management*. During the visit it became evident that most of the students in the TM programme have come from the first cycle programme *Export Engineering* run by the same ISC, bridging the programme between different departments and faculties.

The name of the programme *Technology Management* presumes two main subject blocks: technologies and management. The curriculum label has proved itself in new "study basket" system. The profile suits well to small companies, combining sales manager and engineer. Learning outcomes specify the technological field as advanced nanotechnologies, mechanical and chemical and industrial engineering technologies, represented by the Innovative Technologies courses. Field of advanced industrial engineering technologies is represented by the Reverse Engineering course, Artificial Intelligence in process Control and, partially, Principles of Aesthetics in Engineering. The major part of the final degree projects are focused to materials engineering, some of the final projects do not contain a distinct management-related part but are specialised onto technologies solely.

2. Curriculum design

TM study programme's scope is 120 credits (one credit is proportionate to 26 hours of student contact work at the auditoriums and appropriate individual work hours per week). The Programme consists of two parts: study field disciplines (60credits), appointed by University, research projects devoted for preparation for Doctoral Studies and multidisciplinary subjects (30credits). Master thesis has 30 credits. The amount of programme course units devoted to the research and final thesis make 41% of the whole programme scope.

Many EU TUs distinguish two orientations in the field of Technology Management: supply chain and innovation. These two fields correspond to the activities of an engineer in the private economy. Innovation management, product development management, start-ups and spin-off creation are themes that could be developed further within the TM curriculum.

As it is stated in SER, the amount of credits devoted to the separate course units also enables students to achieve the particular learning outcomes. For contact lessons (theoretical lectures, practical and laboratory work) 720 academic hours are devoted or 22.5% of total workload of the programme. Lectures of the programme take 432 academic hours or 60 % of class room sessions and 13.5 % of the total workload of the programme; the practical training takes 272 academic hours or 37.78 % of classroom sessions and 8.5 % of the whole study programme; laboratory works take 16 academic hours or 2.22 % of class room sessions and 0.5 % of the whole study programme load. Individual work of the students takes 2480 academic hours or 57.75% of the whole study programme amount.

Programme comprises 16 course units (modules). As it was mentioned above, for such type of programmes the 2 main blocks of the programme – the technology- (or branch-)

related dimension and the management-related dimension must be in a good mutual balance, as well as consistent with the name and outcomes of the programme. There are no alternative courses what makes it difficult to bridge this 2nd cycle programme with different ones of the 1st cycle. However, during the visit the Evaluation Expert Team was informed about existing plans to introduce alternative courses. Alumni and employers state the lack of practical skills. In SER, it is indicated, that practice is not mandatory according to the Study Plan. During the visit it was confirmed that only a small part of the students have their practice outside the university. It is recommended to involve a students' practice in the Study Plan.

The programme includes 3 modules of Innovative technologies, as well as module in reverse engineering, etc., content of which reflects the latest achievements in material engineering, rapid product development technologies, modern approach in innovation management and control. Project examples introduced to committee included high-tech topics as solar cells, nanoparticles in concrete, dental implants, quality assurance system for industry lab.

At the same time, some of the modules have repetitive themes, like the module "Logistics, Transportation Systems and Environment Protection" has repetitive themes, like "Innovative technologies in transport" and "Environmentally friendly transportation" in the module Innovative Technologies 2 and 3, respectively. Module „Implementation and Control of Innovations" has similar theme "Importance of innovative technologies and problems of their applications in Lithuania" in the module „Innovative Technologies 1", etc. There is no possibility to free studies; it adds students additional workload e.g., in case off foreign students learning Lithuanian language, or in case of students interested in other subjects (Mechatronics, Sports Engineering).

Technical remark: in the Table 2.2 name of the module with code T210M129 should be "Reverse Engineering", not "Quality Engineering".

3. Staff

The Programme is provided by the joint team of KTU teachers from ISC, faculties of Mechanical Engineering and Mechatronics, Economics and Management and Chemical Technology ISC. The contact hours of 4 professors and 10 associated professors who deliver lectures for full time students is respectively 447 hours per year (what makes 25.6 % of total workload of the programme), and 1090 hours (62.4%). The academic load of other lecturers who teach full time students of the programme is 208 hours (12 %). The invited lecturers usually are from EU partner institutions (LLL programme). They visit ISC according mobility programmes.

Annual pedagogical workload for a full time lecturer is 700–800 hours. The programme lecturers have an extensive experience of working with students – the majority of them are active while performing research and methodological activities. The great number of professors and associate professors has the teaching experience of 13 years, and their practice experience exceeds 19 years.

The study programme is provided by the staff meeting legal requirements.

The average age of the lecturers who work at the programme is 45 years. The average age of the professors teaching at the programme is 54 years. There are no lecturers older than 65 in the programme. The average age of the associated professors is 44 years. It is important to admit that there is a proportional distribution according the age groups in the associated professors' staff group. Turnover of lecturers in the study programme according the age group during period under evaluation is connected with the University's strategic management goals of the university to reduce the average age of the lecturers and is not significant. In experts opinion teaching staff turnover is able to ensure an adequate provision of the programme.

All lecturers of the programme using the mentioned above means during the assessed period developed their qualification – this is preconditioned by the Description of procedure for lecturers and researchers' certification and competition for their position organization. Most of the teachers improved their professional qualification more than once. Teachers have not systematically approached concerning asking their problems or development plans.

During the period under evaluation 5 teachers of ISC visited foreign universities with teaching mobility and improved their practical skills, a total number of teaching and practical training visits is 25. 4 lecturers of ISC participated in the mobility programme that corresponded to the field of their academic interests. Lecturers of other departments, working in TM programme also actively participated in lecturer mobility programmes. Teachers can apply money for conference visiting 2 times per 2 years.

During the period under evaluation, 5 doctoral students defended their doctoral thesis. 2 of the former doctoral students are at present teaching at the ISC, supervising and reviewing final degree projects. Therefore it can be stated that the higher education institution creates conditions for the professional development of the teaching staff necessary for the provision of the programme.

Some of them exceeds or significantly exceeds the minimum qualification requirements. *ISC* lecturers averagely publish 42 scientific articles per year, 10 of which are of the ISI Web of Science category, 7 of ISI Proceedings. *ISC* doctoral students also participate in international scientific and practical conferences in Lithuania and abroad.

Involvement of the teaching staff of the programme in research directly related to the current study programme is rather high; however their involvement in the applied research ordered by industry must be much more active.

4. Facilities and learning resources

The number of well-equipped modern audio-visual classrooms and laboratories of University divisions corresponding to the contemporary high-tech and hygienic norms provide the successful TM programme conduction. The study process is organized in accordance with first and second cycle's studies classroom occupancy norms approved by the rules of Pedagogical work accounting.

ISC staff applied for the renovation of study premises facilities. During the period under evaluation, there are equipped and supplied with all necessary equipment three classrooms and two computer classes. It is planned to install two more classrooms and provide them with necessary equipment.

Available facilities are a sufficient to ensure qualitatively study process, but they should be continuously developed and renewed. The premises for studies are adequate both in their size and quality.

The current technical condition of computer classrooms, computer and software equipment is appropriate to ensure IT training effectiveness. Hardware and software used by TM programme is a modern and legal. For administrative convenience, all computers are connected to a local network, which on its turn, is connected to a high LITNET and the Internet. Computers installed in MS Windows operating system. While preparing text editing works, students use MS Office 2003 office suite. For engineering calculations and design activities students use specialized IT tools.

Laboratory equipment and appliances necessary for the study process installed and systematically renewed in educational laboratories is sufficient in relation to the student number and suitable for application according to its technical level.

Most of students can express their opinion of improvement of this study program. There are friendly atmosphere between students in this faculty. Students get more practical work. Centre of the career offers various places for practice, students are free to choose, and also new job offers by e-mail. Students are satisfied having lots of sport facilities. There are

enough rooms in dormitories, rent price is normal. Study subject – "international communication" is mostly liked to study. Perfect testimonials of alumni students motivate them to choose this study program.

However, computer classes needs to be upgraded by new computers. Latest programs are working slowly. Students wish to get more practical work. Also they refer, that students can choose other foreign language as an optional subject, but they expressed a need to have other foreign language in their study program.

Joint laboratory of ISC and KTU Institute of Materials Science has the following facilities: molecular epistaxis and surface analysis, mass spectrometry system, scanning electron-microscope ion etching and plasma chemical system, automated microscope, vacuum evaporation equipment, semiconductor parameter measurement system, atomic force microscope, X-ray diffractometers and other equipment.

Students can use Central library resources situated in K. Donelaicio st., its reading room, which has 143 working places (including 36 computerized ones). ISC students also have access to the reading room, situated at the Faculty of Mechanical Engineering and Mechatronics (27 working places from which 5 are computerized). Students have all facilities to perform assignments – they can use ISC 50 work places computer classroom if they are not occupied. Academic progress center takes care of psychological support for students. The University has a Pastoral Care Group and Catholic chapel. Mentoring is very popular in the *ISC*. On the problems concerning studies and „every day living" freshmans have mentoring from the representatives of Student Union. Students can apply for Erasmus practice mobility grant. Popularity of this mobility is growing up every year. During the period under evaluation 6 students of *ISC* did professional practice (3 month) in the foreign countries, 12 students participated in the INWENT programme and did their professional practical training and lectures at the University of Kiel (Germany) (6 month practice, 6 month studies).

Information and communication technologies offer the services that meet the needs of University's students, lectures and researchers'. E-learning process at the University is coordinated and supported by e-learning Technology Centre (EMTC), which was founded in 2008 after the reorganization of ITPI Distance Learning Centre, which operated at the University since 1996.

In order to support and develop technical and programming basis that provides university E learning, it is being constantly looked for new technological solutions, the systematic research and testing of the equipment of new e-learning is carried out, new E-learning informational systems are being created, adapted and implemented alongside with newly applied programming equipment. VIPs video classes system is maintained too. It enables university teachers to deliver classes not only from studio, but also straight from their working places, auditorium, home or even being on the visit. The new system has more than 1600 records.

While developing KTU Moodle system, in 2011 there was performed the new Moodle system translation into Lithuanian language, the integration of Moodle system with personal service portal http://mano.ktu.lt and academic information system is further developed.

Students use methodical material prepared by lecturers: slides, lecture syllabus, course descriptions, or homework instructions. Access to reference materials is ensured by providing printed publications, e-mail or via Internet. Students may contact the lecturer and get individual consultations via e-mail.

Therefore it can be said that teaching materials are accessible and adequate.

5. Study process and student assessment

Formally, persons who had been awarded a bachelor qualification degree of technological and physical sciences can be admitted to the Programme. Persons who have

chosen studies not corresponding to their bachelor qualification degree, which are presented in the Admission Requirements, also persons who have the Professional bachelor degree have to finish additional studies the extent of which is appointed by the University. In previous years majority of all admitted students have come from the Export Engineering programme run by the same ISC. Recently students intake has become wider, e.g., from Chemical Engineering, Informatics, Erasmus Student process. The assessment is in line with programme objectives. Students appear to receive adequate communication and the official guidelines are respected. Student (mainly freshmen) drop out is acceptable, taking place during the first year. Tutoring and mentoring initiatives introduced by the University have brought visible improvements in relation to fresher integration. Student assessment is described and appears to include a wide selection of controls, which complies with the variety of the programme's LOs. Students also have fair chances to pass an exam if they fail to pass it the first time. Course evaluations are conducted every semester, showing willingness constant process of improving the programme.

The programme is popular among the students –the competition in 2009 was 2.3 candidate to one place; in 2010 – 1.8 candidate to one place and 2011 – 1.9). Students' number according the years: 15 – in 2009, 20 – in 2010, 15 (quota 11+4 additional state financed places) – in 2011. 22.5% of current *TM* students are graduates from other faculties.

Students who were admitted to the programme in 2009 and 2010 successfully graduated the programme. Only in 2011 four students dropped out from the first term because of the successful employment, which was impossible to combine with the studies. The relationship between the students' motivation and their achievements can be illustrated by the fact that independently from admission competition grade all students devote their energy to studies and their average grade is 8.7.

The admission requirements are well-founded.

The time table is made in compliance to the Regulations of lessons conduction approved by the Order No. A – 306 of 13 December 2003 of the Rector and the Rules of pedagogical work accounting thus ensuring even distribution of the lectures of course units (lectures, seminars, practical lessons, laboratory works and other) in the semester. Working load of the students is rationally distributed – classroom hours do not exceed correspondingly 8 and 26 academic hours per day and week.

Study course units, classroom and individual work tasks are carried out and they are checked gradually during semester according the plan given in the programme of a course unit and exam is taken during exam session of 4 week duration or in advance before it. Students have no less than four days period to prepare for the exam. After the execution of all tasks and receiving a Dean's permission the student can pass exams externally. Failure during the session can be retaken before the new semester beginning. Debts can make not more than 15credits. For serious reasons, the Dean can prolong the exam session until the end of the first month of new semester.

Kaunas University of Technology organized the annual Conference of Young Scientists of different fields. *TM* programme students actively participate in the conference „Mechanical Engineering", which deals with mechanical and industrial engineering problems. It examines the reliability of mechanical systems design, transport and thermal engineering, materials, implementation of innovative technologies, industrial and packaging technologies. The conference invites students, postgraduates and doctoral students. There was evidence in success of the programme as provider of PhD students. There are common events like Springfest for students, where can be invite also lecturers.

4 students did exchange studies at foreign partner-universities 3 of them at Linkoping University (Sweden), 1 – in Switzerland. The programme is being organized from 2009. While comparing the *ISC* students with the students of other faculties it is possible to admit that the motivation of *ISC* students for studies abroad in partner institutions is very high. Even

66% of all *ISC* first study cycle third year (the year, which is participating in Erasmus mobility programme) students are studying according the exchange programme for a semester or for the whole academic year. 22 foreign students were placed for temporary studies at the *ISC*: 10 from France, 4 from Spain, 5 from Turkey, 2 from Italy, 1 from South Korea.

Students, who came according to the mobility programme, choose *ISC* first cycle *Export Engineering* and second cycle *Technology Management* programme, because studies are conducted in English. Students from different foreign countries join the course units of *TM* programme lecture flows and executing final degree projects. Therefore experts think that students have good opportunities to participate in student mobility programmes.

Regular spread of updated actual information about of study modes, branches, financing, programme aims and learning outcomes, evaluation of achievements, elective courses, schedules, mobility, and etc. is ensured by regular renewal (updating) of the university and *ISC* web site and KTU annual publications.

On the possible problems concerning studies the students get consultations from the representatives delegated by Student Union, tutors of academic groups, vice-director who coordinates the studies.

Each year in collaboration with employers, lecturers take active part in the social-educational event "Career Days" during which students are informed about jobs offering enterprises. It is also worth to mention the importance of lecturer's recommendations while getting the suggestions about vacant job places and practical training places from the new and regular suggestions providing enterprises.

Programme students have the opportunity to participate in the 20 sport branches and 15 art groups of University. Academic Progress Centre takes care of psychological support for students. The University has a Pastoral Care Group and Catholic chapel.

Non-refundable financial supports for the programme's students are granted to the students from the budget financing according the Rules of scholarships of KTU.

Students of the programme (non-residents of Kaunas city) during the period of their studies have the possibility to live in the University dormitories. All dormitory rooms are equipped with Internet service over the Internet broadcast television network; all dormitories are equipped with self-service laundries.

For comprehensive and objective assessment of students' achievement results the ten grade criterion scale and accumulation scheme motivating systematic performance of a student throughout out all the semester are applied. Semester individual work (laboratory work, course work, individual work, etc.) are evaluated by a grade, final grade is calculated during exam session – the separate grades are multiplied by weighted factors and the obtained products summed up.

Student achievement assessment criteria are made public at the beginning of the semester– the first lesson the teacher presenting the purpose of study course unit, themes, individual work schedule of tasks and their influence on the final grade.

Feedback for the students about their performance is usually given by the lecturers while presenting and explaining the students the results of their performed written and oral tasks. Lecturers present their evaluation in writing assessments, together with oral feedback.

Final degree project is defended at the public session of industrial engineering qualification commission by the commission appointed by the Rector's Order. The commission awarding qualification degree of industrial engineering consists of seven competent researchers in the study field, practitioners and professionals.

The assessment system of students' performance is clear, adequate and publicly available.

Judging according the alumni survey results of the evaluation period of 2010, employability of the alumni is sufficient to justify the need to study the programme. From the 85.4% of full time study graduates who participated in the survey, 74.3%of graduates found jobs in enterprises and organizations during period of studies consistent with the qualification

awarded 6.2% choose the third cycle studies at *KTU*, 10.8% of graduates found jobs after graduating,8.70% of graduates work outside the profession (trade, construction, manufacturing, service sector).

During the period under evaluation, the interviewed *TM* programme graduates mentioned that the programme met their expectations. All graduates responded positively to the knowledge evaluation system, studies environment.

Leaders of companies and enterprises, who employ graduates, present the positive evaluation of the preparation of masters at *ISC*. They underline that graduates have sufficient theoretical knowledge. The employers stress the importance of perfect command of several foreign languages, which is demonstrated by the *ISC* alumni not only at the level of daily communication, but also at the professional usage.

6. Programme management

The programme is constantly improved and updated by the Study Programme Committee (*SPC)*. *SPC* consists of 15 competent members (9 of them –professors).

While taking the decisions on programme conduction and quality assurance, the committee cooperates with the *ISC* staff, and after having regarded to their proposals, makes offerings for the renewal projects and proposals of the currently conducted programme, which is registered in the register of study programmes on module renewal and preparation of the new ones to the *ISC* Council. Social partners take part in the SPC activities: students delegated by the faculty Student Union, the representative of the employers, staff delegated members from Faculty of Mechanical Engineering and Mechatronics as well as other faculties, Science Institute and the Academic Affairs Office staff. They take the responsibility for changes in the programme by personal voting. *SPC* presents its proposals which are agreed with the *ISC* Council to the academic department and the later after making summarizations (generalizations) presents for approbation to Rectorate and approval of the senate.

Committee presents and certifies course units coordinated by the department, makes plans for the preparation of methodological literature. It appoints the reviewers for assessment of the prepared teaching materials and methodologies and taking into account their assessment and recommendations appoints the status of a manuscript, educational book or makes offering for the senate study commission to appoint the status of a textbook. The proper conduction of the programme and its improvements are ensured by the programme coordinator.

It can be said that responsibilities for decisions and monitoring of the implementation of the programme are clearly allocated.

Programme structure and content is revised and not essential changes are made annually according to the schedule for the arrangement for new academic year is prepared by Vice-Rector and Studies Office. *SPC*, on its turn, every three years performs the compulsory certification of the revised course units.

Human resource management is realized by the qualification commission appointed by Rector of University. Commission followed by Research and Higher Education Act and Description of procedure for lecturers and researchers' certification and competition for their position organization determines whether lecturer meets the qualification requirements for the post for a five-year term certifies them and organizes competition for their position occupation.

At the end of each semester in order to provide a feedback, according the University procedure, the *SPC*, the center Council and Senate resolutions, the participating students have the opportunity to evaluate the content of course units and quality of teaching. The University's Academic Information System website provide for students personal e-

assessment questionnaire. This survey aims each course unit to be assessed by all students who had chosen it, thus contributing to its development. Long-term survey results are used by the *SPC*, while certifying course units, by qualification committee, faculty administration for the evaluation of lecturers work, by student representatives. The general results of the survey are discussed in the Dean's Office and department meetings. Only summarized survey statistics is made public.

Lecturers can see students survey results, however only taught course units' assessment is available for lecturers. Administration of faculty can see all assessment results of course units delivered by staff of the department.

The outcomes of internal and external evaluations of the programme are used for the improvement of the programme.

Programme evaluation processes, results, and programme development stages are regularly discussed at *ISC* Directorate meetings, *ISC* Council, with staff of studies office and social partners – leaders and workers of cooperating business enterprises and students. The analysis of information collected constantly allows making the statement that the overall opinion of the lecturers – programme's executors, students, graduates and employers about the Technology Management programme is favorable.

KTU is running the project „The development of internal education quality management system in Kaunas University of Technology" which is funded by European Union funds. The project aims to develop an internal study of quality management system in *KTU*, and to enable administrative staff to develop special competencies, related to the implementation of internal quality management systems, their development and monitoring.

Currently, the KTU internal quality assurance system is maintained and developed according the KTU Regulations for an internal quality assurance. The Regulations are approved by Resolution No.49 of 2 July 2010 of Senate. The internal quality management of studies model and general assessment model will be developed relying on European higher education quality assurance provisions and guidelines (2006), the common assessment Framework (CAF) and the European Foundation for Quality Management Excellence Model based on (MSKCCEFQM). In 2011 together with University Administration, Senate and University Students' Council there was prepared a new University Codex of Academic Ethics (approved by the Senate in January 2012). There is a perspective of great work while implementing Codex norms into Studies Process, publishing the data of the research, fostering the academic culture. Programme managers have looked at several European degrees, one particularly similar is in Angels (France). Currently the opportunities for a joint degree together with them are considered.

III. RECOMMENDATIONS

1. The "technological" dimension (the branch-related) must be clearer defined and revealed in the outcomes; breakdown and structuring of the key learning outcomes need more systematic approach in order to avoid looseness in the outcome content interpretation compared with the Framework Standards' original requirements.
2. It is advisable to include elective/free courses into the programme to allow broader involvement of different engineering fields. Regarding final thesis, it is recommended to make it mandatory to include a distinct management-related part in the final thesis. As an alternative, it might be reasonable to introduce specializations in the study programme, where some students specialize more in technologies, and others in management.
3. Involvement of the teaching staff of the programme in research directly related to the current study programme is rather high; however their involvement in the applied research ordered by industry should be much more motivated.

4. The laboratory equipment meets the requirements, while the major part of scientific equipment is for material research mostly. According to programme outcomes, there could be also other engineering sciences covered.
5. The committee recommends continuing benchmarking the TM curriculum with the content of Master's degrees in Mechanical Engineering awarded by the best European TUs.

IV. SUMMARY

Second-cycle programme *Technology Management*, run by the ISC of KTU, aims to prepare engineering specialists who alongside with engineering knowledge in nanotechnologies, mechanical, chemical and industrial engineering technologies also have knowledge on economics and management, including establishment and management of hi-tech firms; management of innovations, production and marketing activities. The programme aims and learning outcomes are well defined, clear and publicly accessible. The curriculum design meets legal requirements. The programme reflects the latest achievements in the engineering technologies covered by it.

Specialists of similar profile are highly demanded in the labor market. The technological content of the curriculum puts the main accent on mechanical engineering; however, goods and products manufactured in others engineering areas could be also related to this educational opportunity. The name of the programmes is broad enough. Themes of the final degree projects are mostly related to material engineering, there is however needed to emphasize management-related part; furthermore, the curriculum has no alternative courses. Also practice should be included into the curriculum.

The study programme is provided by the staff meeting legal requirements. Premises for studies are adequate both in their size and quality. Availability of computer equipment meets the requirements, but need broadening to attract students entering from variety of engineering fields.

Students are motivated and their drop-out is rather low, they have good opportunities to participate in student mobility programmes, while their participation in applied research activities could be more active. Stakeholders are involved in the evaluation and improvement processes. Professional activities of the majority of graduates meet the programme providers' expectations; information and data on the implementation of the programme are regularly collected and analyzed.

The programme is well managed but the number of students intake could be larger, experts encourage management to monitor and benchmark top universities best practices to become even more international.

V. GENERAL ASSESSMENT

The study programme Technology Management (state code – 612H70004) at Kaunas University of Technology is given **positive** evaluation.

Study programme assessment in points by fields of assessment.

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Staff	3
4.	Material resources	3
5.	Study process and assessment (student admission, study process student support, achievement assessment)	4
6.	Programme management (programme administration, internal quality assurance)	3
	Total:	**19**

*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:
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Grupės nariai:
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Prof. Luca Canetta
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Vertimas iš anglų kalbos

KAUNO TECHNOLOGIJOS UNIVERSITETO ANTROS PAKOPOS STUDIJŲ PROGRAMOS *TECHNOLOGIJŲ VADYBA* (VALSTYBINIS KODAS – 621H77004) 2012-12-20 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-174 IŠRAŠAS

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa *Technologijų vadyba* (valstybinis kodas – 621H77004) vertinama **teigiamai**.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	3
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* 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

Antrosios pakopos studijų programa *Technologijų vadyba,* kurią siūlo KTU Tarptautinių studijų centras, siekiama parengti inžinerijos specialistus, kurie įgytų ne tik nanotechnologijų, mechanikos, chemijos ir pramonės inžinerijos technologijų žinių, bet ir ekonomikos ir vadybos žinių, įtraukiant aukštųjų technologijų įmonių steigimą ir vadybą, inovacijų vadybą, gamybos ir rinkodaros veiklą. Programos tikslai ir studijų rezultatai yra gerai apibrėžti, aiškūs ir viešai prieinami. Programos turinio sandara tenkina teisinius reikalavimus. Programa atspindi naujausius studijuojamų inžinerijos technologijų pasiekimus.

Studijų kokybės vertinimo centras

Panašaus išsilavinimo specialistų paklausa darbo rinkoje yra labai didelė. Technologiniame programos turinyje akcentuojama mechanikos inžinerija, tačiau su šia ugdymo galimybe galima būtų susieti ir kitose inžinerijos srityse gaminamas prekes ir produktus. Programos pavadinimas yra pakankamai platus. Baigiamųjų projektų temos daugiausia yra susijusios su medžiagų inžinerija, tačiau reiktų akcentuoti ir su vadyba susijusią dalį. Be to, programoje nėra alternatyvių dalykų. Į programos turinį reiktų įtraukti ir praktiką.
Studijų programą vykdo teisinius reikalavimus tenkinantis personalas. Studijoms skirtų patalpų dydis ir kokybė yra tinkami. Kompiuterinės įrangos prieinamumas tenkina reikalavimus, tačiau norint pritraukti studentus iš įvairiausių inžinerijos sričių jos kiekį reikia didinti.
Studentai yra motyvuojami ir nebaigusių studijas studentų skaičius yra gana nedidelis. Studentams suteikiamos geros galimybės dalyvauti studentų mobilumo programose, tačiau jų dalyvavimas taikomųjų mokslinių tyrimų veikloje galėtų būti aktyvesnis. Socialiniai partneriai dalyvauja vertinant ir gerinant studijų procesą. Daugumos absolventų profesinė veikla atitinka programos vykdytojų lūkesčius. Informacija ir duomenys apie programos įgyvendinimą yra reguliariai renkami ir analizuojami.
Programos vadyba vykdoma gerai, tačiau priimamų studentų skaičius galėtų būti didesnis. Ekspertai skatina programos vykdytojus stebėti ir lygiuotis į geriausių universitetų gerąją praktiką, kad programa taptų dar tarptautiškesnė.

III. REKOMENDACIJOS

1. „Technologinę“ dimensiją (susijusią su šaka) būtina aiškiau apibrėžti ir atskleisti studijų rezultatuose. Esminių studijų rezultatų išskaidymas ir struktūra turėtų būti sistemingesni, kad būtų išvengta netikslaus studijų rezultatų turinio interpretavimo, lyginant su originaliais Pagrindinių standartų reikalavimais.

2. Patartina į programą įtraukti pasirenkamuosius / laisvuosius dalykus, kad būtų aprėpta daugiau įvairių inžinerijos sričių. Kalbant apie baigiamuosius darbus, rekomenduojama nustatyti privalomą reikalavimą į baigiamąjį darbą įtraukti konkrečiai su vadyba susijusią dalį. Kaip alternatyvą gali būti racionalu į studijų programą įvesti specializacijas, kuriose vieni studentai daugiau specializuotųsi technologijose, o kiti - vadyboje.

3. Tiesioginis programos dėstytojų įtraukimas į su dabartine studijų programa susijusią mokslinę veiklą yra gana aukštas, tačiau jų dalyvavimas pramonės užsakomuose taikomuosiuose tyrimuose turėtų gerokai labiau skatinamas.

4. Laboratorijos įranga tenkina reikalavimus, tačiau didžioji dalis mokslinės įrangos yra skirta daugiausia medžiagų tyrimams. Remiantis programos studijų rezultatais, galima būtų aprėpti ir kitus inžinerijos mokslus.

5. Komitetas rekomenduoja ir toliau sudarant TV studijų programą lygiuotis į geriausių Europos TU siūlomų mechanikos inžinerijos magistro studijų programų turinį.

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Studijų kokybės vertinimo centras

Paslaugos teikėja patvirtina, jog yra susipažinusi su Lietuvos Respublikos baudžiamojo kodekso[1] 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

Vertėjos rekvizitai (vardas, pavardė, parašas)

[1] Žin., 2002, Nr.37-1341.