STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

KAUNO TECHNOLOGIJOS UNIVERSITETO *TRANSPORTO PRIEMONIŲ INŽINERIJOS* (62403T102, 621E20001) STUDIJŲ PROGRAMOS

VERTINIMO IŠVADOS

EVALUATION REPORT OF *VEHICLE ENGINEERING* (62403T102, 621E20001) STUDY PROGRAMME at KAUNAS UNIVERSITY OF TECHNOLOGY

Grupės vadovas: Team leader:	Prof. Andrew Day
Grupės nariai: Team members:	Prof. Jørgen Kristiansen Prof. Mathias Paschen Prof. Andrzej Reński Dr. Vaidas Liesionis

Išvados parengtos anglų kalba
Report language - English

Vilnius
2010

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Transporto priemonių inžinerija***
Valstybiniai kodai	62403T102, 621E20001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Transporto inžinerija
Studijų programos rūšis	univeritetinė
Studijų pakopa	antra
Studijų forma (trukmė metais)	nuolatinė (2)
Studijų programos apimtis kreditais[1]	80
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Transporto inžinerijos magistras
Studijų programos įregistravimo data	1997-05-19

[1] – vienas kreditas laikomas lygiu 40 studento darbo valandų

INFORMATION ON EVALUATED STUDY PROGRAMME

Name of the study programme	***Vehicle engineering***
State code	62403T102, 621E20001
Study area	Technological sciences
Study field	Transport engineering
Kind of the study programme	university
Level of studies	second
Study mode (length in years)	Full-time (2)
Scope of the study programme in national credits[1]	80
Degree and (or) professional qualifications awarded	Master of Transport Engineering
Date of registration of the study programme	19-05-1997

[1] – one credit is equal to 40 hours of student work

CONTENTS

I. INTRODUCTION

The MSc programme 'Vehicle Engineering' at the Kaunas University of Technology (KTU) has been reviewed at the same time as the BSc programme "Vehicle Engineering" at the same University (KTU). Kaunas University of Technology is a large well-established university with 14 faculties, 14 Research Institutes and Centres, and 75 Departments [1]. It has an excellent level of well-established and highly regarded research activity.

Both the MSc and the BSc programmes are operated by the Department of Transport Engineering; one of 8 departments in the Faculty of Mechanical Engineering and Mechatronics. The Dean (Professor Dr. habil. Algimantas Fedaravicus) reports directly to the Rector of the University, and the Faculty Council organizes strategy and activity which the Dean and Vice-Deans then execute. The Department is responsible for all stages of the MSc and BSc study programmes in Vehicle Engineering. In addition to the 8 Departments, the Faculty has 4 Scientific Departments and 4 Associate Scientific Departments. It employs 24 full Professors and 60 Associate Professors among more than 150 staff, some of whom are Members of the Lithuanian Academy of Sciences. Research activities in the Faculty associated with the field of Transport Engineering include the dynamics of mechanical and manufacturing systems, vibration analysis, and mechatronic systems. Faculty staff are actively involved in 3 EU research projects under FP 7 (having previously been involved in FP 5 and FP 6 projects), and have organized the international conference 'Transport Means' every year since 1995.

The MSc programme was registered in May 1997 and in 2001 external evaluation was carried out by experts from the Lithuanian Centre for Quality Assessment in Higher Education (CQAHE). Their report emphasized the appropriate structure of the programme, the sufficient qualifications of the lecturers, well-functioning quality improvement, provision of methodological publications, and to increase student participation in research. As a result corrections to the programme content and improvement in facilities were made.

The Vehicle Engineering MSc programme is a 'deepening' programme with 80 credits over 2 years duration full-time. The programme language is Lithuanian. The strategic vision for the MSc programme includes strong research activity in the field, a focus on design and maintenance to help develop the transportation sector in the country (transportation is the 3rd biggest industry in Lithuania), and a focus on the use (exploitation) of vehicles (which is less theoretical) compared with Automotive Engineering programmes. The features of the programme include management in Transport Engineering and Transport Technology Systems Engineering, and the specialist themes (pathways) are Road Vehicle Engineering, Railway Transport Engineering, and Aviation Engineering. The MSc (and BSc) programmes have strong support from 'social partners' (industrial partners and commercial organisations), in particular those in the fields of railway and light aircraft and helicopters.

The MSc programme mainly admits graduates from the BSc VE programme at KTU, but graduates from other universities may be admitted if they meet the entry requirements. The number of students admitted to the MSc Vehicle Engineering seems to be around 10 students each year.

[1] Presentation, 22/10/2010

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

1.1. Programme demand, purpose and aims

The Self-evaluation report includes a clear expression of the rationale for the MSc Vehicle Engineering programme. Key drivers are:

- The importance of transport to the Lithuanian economy;
- Renewal of transport technologies and infrastructure;
- Improvement of employees qualifications and strong demand for specialists with /MSc qualifications;
- Implementation of new services;
- EU requirements (e.g. environmental pollution, renewable energy sources).

The need for MSc graduates who have the extra depth of knowledge, and hence the need for the programme is confirmed by the cooperation agreements between the Faculty and Railway, Aerospace and Road Transport enterprises. The aims of the MSc programme are clearly in-line with the need for highly qualified specialists for the development of transportation in Lithuania, which is the 3rd biggest industry in the country.

The specific knowledge and understanding acquired in Second Cycle Transport Engineering / Vehicle Engineering studies should include the following:

- Knowledge and understanding of transportation system structure, elements, and interrelations of elements, as well as knowledge and understanding of logistics;
- Knowledge and understanding of the construction and the functional principles of vehicles (transport means);
- Knowledge and understanding about the systems of the transportation system being studied, as well as knowledge and understanding about the trends of development of such systems, and peculiarities of use of means of transportation;
- Knowledge and understanding of transportation technologies and circumstances for optimum use of means of transportation;
- Knowledge and understanding of specific environmental and traffic safety problems.
- The specific practical abilities acquired in the course of transportation engineering studies include the ability to establish and analyse the characteristics of maintenance/use of means of transportation taking into account the traffic, road, and environmental conditions.

The MSc programme as presented conforms to these statements in terms of deepening the student's competence gained during the first cycle studies.

The programme aims address the needs of an industrial and commercial sector of Lithuania's economy, viz. Transport, and are highly relevant not only to the country's trade but also to its neighbours for whom Lithuania is an important trading route. This was discussed extensively in the review meeting with Programme staff.

Transport engineering is also taught in other universities and colleges in Lithuania (e.g. VGTU, Klaipeda State College). The individual features of the KTU MSc Vehicle engineering programme include more universal content and providing a wider area of activities for its graduates in comparison for example with the Transport engineering programme offered by Vilnius Gediminas Technical University according to the KTU Self-evaluation report. However according to the VGTU Self-evaluation report the difference is that the KTU programme is more focused on

production processes and technologies, while the VGTU programme focuses more on the technical maintenance of machinery, diagnostics, safety, and analysis of operational parameters.)

1.2. Learning outcomes of the programme

The (Programme) Key learning outcomes were updated in 2005, and are clearly presented in Table 2.1 of the Self-evaluation report. These are categorised under 4 areas:

- Knowledge and understanding (A);
- Intellectual abilities (B);
- Practical abilities and skills (C);
- General transferable abilities and skills (D).

In each module descriptor (Study Module Programme – SMP see Appendix 2 of the Self-evaluation report) the learning outcomes which are addressed by the module are identified. From this the contribution made by each study module to the Programme level learning outcomes is defined on Table 2.2 of the Self-evaluation report. This clearly indicates a coherency between the Programme learning outcomes and the Module learning outcomes which is extremely good practice.

The learning outcomes in Table 2.1 of the Self-evaluation report are carefully and clearly worded and they are well connected with the aims of teaching at the MSc level. However the learning outcomes do not include two elements which the Reviewers considered to be essential for an MSc (Cycle 2 programme). These are:

(i) Communications skills;

(ii) Critical review and evaluation;

The Reviewers recommend that communication, in written and verbal form, should be specifically included in 'General transferable abilities and skills' (D). This learning outcome would, for example, be addressed by a language module, an ICT module, or by a module which involves teamwork (although teamwork is specified under D1, this focuses on initiating activities and leading; both of these need communication skills).

One of the differentiating features between Cycle 2 graduates and Cycle 1 graduates is their ability to critically review and evaluate not only their own work, but that of others as well. This is mentioned in B1, but the Reviewers believe that the principles of critical review and evaluation must be developed in all categories of learning outcomes (A) – (D). For example, learning outcome A4 might state "will know the newest materials, ways of workability and reliability assurance in the vehicle" and be able to critically review them in order to select the most appropriate". The Reviewers noted that this feature of a Master qualified graduate was generally under-represented in the Dissertation reports of the final projects (see Section 5.4 later in this report).

Comments:

The Reviewers have noted that the area of learning outcomes has been developed systematically and has distinctive features, but requires further refinement so that it becomes exceptionally good.

The learning outcomes are reasonably well distributed among the study modules (Table 2.2 of the Self- evaluation report). The two Research Project modules (T000M122 and T000M123) and the Final Degree Project module (T000M120) address more of the learning outcomes; all of those under 'A' and 'D', plus a substantial proportion of those under 'B' and 'C'.

According to the procedure approved at the University, a system of assessment of the study programmes exists in the Faculty of Mechanical Engineering and Mechatronics, within which learning outcomes are also discussed and improved. The lecturers, students and social partners participate in the procedure; particularly the participation of employers is of great advantage, as

they can transfer feedback information about real industry demands for specific knowledge and skills of graduates.

Recommendations:

Develop a general vision for the programme which includes the needs of employers, and the needs, expectations and aspirations of staff and students.

The Department should meet more formally and regularly with its (very supportive) stakeholders (viz. Graduates and social partners) e.g. to identify opportunities for specialist subjects which do not seem to be in the Department's vision for the programmes. Despite the emphasis on road vehicle engineering, especially automotive (cars) there is little evidence that the graduates use this knowledge and expertise in their subsequent employment. Perhaps there should be more emphasis on other vehicles – aviation, rail or commercial?

The Faculty staff should make more use of information from the University procedure for study programme assessment in the Faculty within which learning outcomes are also discussed and improved. The lecturers, students and social partners participate in the procedure; and the employers can feedback into the learning outcomes about real industry demands for specific knowledge and skills of graduates. An example would be the provision of a 'stage' evaluation by the students of the whole year (or the whole semester).

More discussion and reflection in final project dissertations, especially Masters should be encouraged, and Learning Outcomes should be reviewed to support this.

Communication, in written and verbal form, should be specifically included in the Programme and Module Learning Outcomes e.g. under 'General transferable abilities and skills' (D). Languages, especially Russian, are strongly encouraged by social partners. Generally the teaching of communications should be enhanced, e.g. by teaching in foreign languages.

2. Curriculum design

2.1. Programme structure

The Reviewers agreed that the study volume in hours and credits is adequate for Cycle 2 (MSc) degree study.

Analysis of the MSc programme structure and comparison of this programme with the BSc programme in Vehicle Engineering at the same University indicates clearly that the aim of the programme is to complement and to deepen knowledge gained from the first cycle (BSc study). Taking this under consideration, the Reviewers agreed that the programme is well composed and the selection of subjects (modules) is suitable in terms of the aims and in terms of the legal requirements. On the other hand this close linkage between the two programmes makes it more difficult for graduates from BSc studies other than Vehicle Engineering at KTU to enter the MSc programme. Such entrants would need to complete 'obligatory' subjects before admission.

Students have limited possibilities to individualise their programme of study. Only 2 modules (8 credits) are permitted as alternative (deepening) subjects and only 4 credits are allocated for elective subjects. This is below the national recommendation for new programmes (minimum 20 National credits for university defined and student self-elective subjects) and the Reviewers recommend that the programme management team increases the number of credits available for university defined and student self-elective subjects to bring it into line with the national recommendation for new programmes. The module descriptors for the elective modules should be included in the self-evaluation report.

2.2. Programme content

The programme content complies with the formal requirements insofar that it is "comprised of study field subjects which are of a higher qualitative problem-solving or scientific innovation level as regards the study content (in comparison with the first level (undergraduate) studies". As such it can be assessed as a very good deepening (2nd cycle) part of an integrated 6 year study programme (BSc plus MSc). However, as a 'stand-alone' cycle 2 programme, the modules look somewhat unrelated, and for this reason the Reviewers would like to see an 'integrating' module (sometimes called "capstone") where knowledge gained over a number of specialist modules is drawn together to a single application example. In principle the two research projects and the final project could provide this, but the syllabus presented in the module descriptors of the former suggest that this is not the purpose of the 'Research project' modules, while the Reviewers found the final degree projects and reports to be somewhat limited in this respect.

The modules specify a limited number of hours each week for practical lectures and laboratory work. Over 4 semesters, 7 modules (26 National credits) include practical lectures, and 2 modules include laboratory work. Whilst this is not, in itself, a problem, the students indicated how much they valued the practical aspects of the course, in particular the application of theoretical knowledge, and the staff commented that they thought the good ratio between "theory and practical" was a strength of the BSc and the MSc programmes. The importance of 'making as well as designing', and 'practical knowledge in aviation maintenance' were excellent examples of course strengths cited by the staff. Therefore the Department may wish to review the role of practical application work in each part of the integrated BSc and MSc programme.

Comments:

Overall the Reviewers observed that the area of curriculum design has been developed systematically and has distinctive features. The inclusion of Quality Assurance and Personnel Management modules in the curriculum is commended as these two subjects are very useful in a career in Transport Engineering.

Recommendations:

Improve the curriculum design by further refinement in the following areas:

- Review the close linkage between the BSc and the MSc programmes to make it easier for graduates from BSc studies other than Vehicle Engineering at KTU to enter the MSc programme. Review and formalise the need for such students to complete 'obligatory' subjects before admission.
- Increase the number of credits available for university defined and student self-elective subjects to bring it into line with the national recommendation for new programmes.
- Include the module descriptors for the elective modules in the self-evaluation report.

Consider incorporating in the curriculum an 'integrating' module where knowledge gained over a number of specialist modules is drawn together to a single application example.

Review the role and time of practical application work in each part of the integrated BSc and MSc programme.

3. Staff

3.1. Staff composition and turnover

There was a small number of academic staff (teachers) who had recent (<10 years) practical industrial experience associated with the subjects they teach. Some of this was very good, e.g. staff members who completed the BSc, pursued a career in industry, and then returned to the University to complete a Masters and PhD. In any group of research-active academics there are opportunities

to extend practical industrial experience through collaborative research projects, and there was clear evidence of this with evidence of 'constant collaboration' through research contracts and commissions'. It appeared from the self-evaluation report that exchange of staff between University and industry was limited, from the point of view of formal recent industrial experience.

Turnover of academic staff participating in the MSc programme appeared to take place mostly through a well-defined academic career cycle; from Doctoral student to Professor. The majority of staff have completed their degrees at KTU and have continued at KTU on to an academic career. Whilst this is applauded from the point of view of career opportunity and progression, the Reviewers did feel that some external refreshment of staff would bring benefit to the Department. It was also noted that staff felt that a decline in the number of students would present fewer vacancies for young staff.

The Reviewers noted that the representation of female academic staff in the Department was very low to the point of being unsatisfactory, and recommend that this is addressed at Faculty level in planning for staff composition and turnover.

The level of international mobility of academic staff for teaching related assignments was relatively low (2 or 3 each year), and a shortage of financial resources was suggested as a reason; this limits the possibility for leave from the University. In the meeting with the academic staff no-one had undertaken recent Erasmus exchange although the Reviewers were assured that 3- 4 staff each year participated in international exchange. The Reviewers would wish to encourage staff to take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme where there is no direct impact on the institution's financial resources. More could be done here.

3.2. Staff competence

There is a Faculty level qualifications commission for the certification of researchers and lecturers. The academic qualifications of the academic teaching staff were recognised as high and exceed the national requirements. All subjects in the programme are taught by professors or associate professors (>80%), some of whom have significant research achievements. Many interesting and advanced research papers have been published by academic staff, although the majority of these appear to be in the Lithuanian language. Staff are therefore encouraged to publish in English (as this is the de facto international academic publication language) in order to bring their excellent work to a wider – global – audience. It was not always clear that research activity corresponds directly to the subject(s) taught. However it was clear that some staff had at least 10 years of professional work experience which corresponded to the applied subjects they teach and most of the teaching appeared to be well up-to-date.

Professional development of the academic staff is good from the point of view of research; the International Conference on Transport Means which is held annually at Kaunas University of Technology offers an ideal opportunity to support the professional development of academic staff. More professional development in terms of international exposure and experience, and industrial experience, would be beneficial. As part of this the Review team would encourage all staff to improve their English language skills.

Comments:

The Department's staff have developed systematically over many years and has distinctive features including substantial research track record and achievement. Staff who have joined from industry with the background practical and applications knowledge that brings are commended. Staff development in the areas of practical experience, international mobility, and English language capability would benefit from further refinement.

Recommendations:

Address the under-representation of female academic staff in the Department at Faculty level in planning for staff composition and turnover. Review academic staffing strategy relating to the external refreshment of staff.

Staff should take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme where there is no direct impact on the institution's financial resources.

Facilitate and encourage academic staff to undertake more professional development in terms of international exposure and experience, and gain more industrial experience. As part of this staff should improve their English language skills.

4. Facilities and learning resources

4.1. Facilities

The premises for the programme delivery were generally sufficient for the students' studies and were generally in good condition with evidence of recent improvement.

The Faculty of Mechanical Engineering and Mechatronics had many teaching laboratories which were appropriately equipped. Basic mechanical engineering and more advanced manufacturing including CADCAM for example have good practical facilities. Vehicle practical facilities are focused on automotive. However according to the small amount of practical / laboratory work in the programme, it was not expected that they were used very much by the MSc students. Computer classrooms were well-equipped with computers; hardware and software. For engineering calculations and design projects CAD software is available which is of a universal standard, used across the world. The links between research activities and associated facilities / equipment with the MSc programme studies were not clearly evident.

4.2. Learning resources

Books, textbooks and periodical publications are available in the Central University Library and in its branch at the Faculty of Mechanical Engineering and Mechatronics. Library facilities were good and the students indicated that they found the service they provided very useful. The reading room of the Faculty Library is open on afternoons and on Saturdays in order to enable part-time students to use the library. Lecturers and students have access to the electronic catalogue from computers in the reading rooms. However, since many of the MSc students combine studies with full-time employment, the 'opening hours' might usefully be extended. (Currently: Mon.-Thu. 8:00-19:00; Fri. 8:00-18:00; Sat. 9:00-15:00).

Students can use the learning materials prepared by lecturers in form of slides, conspectus and methodological guides. There are also some text books prepared by the lecturers. The number of copies of text books for the programme Vehicle Engineering which are available in the Library is adequate for the number of students. The access to learning materials is possible also via e-mail and the internet.

Comments:

The area of facilities and resources has developed systematically and the reviewers would like to see more provision / use of research facilities and resources in the delivery of the MSc programme.

Recommendations:

Identify and promote to the students during the programme studies the links between research activities, associated facilities and equipment, and the MSc programme studies.

Review the 'opening hours' of the library facilities with a view to extending them.

5. Study process and student assessment

5.1. Student admission

Numbers of applications to the MSc course were not presented in the Self-evaluation report. The admission qualification scores were given (Table 2.5) which indicated a reduction in the scores over the 5-year period. However, it appeared from Table 2.6 that the number of students admitted has increased since 2005.

Applicants can be directly admitted to the Cycle 2 studies (MSc in Vehicle Engineering) if they have a diploma proving their graduation from the KTU Cycle 1 university study programme. Admission is carried out on the basis of competition. Some information was provided about the admission requirements for other candidates, viz. which field of BSc study can be considered for entry, and what applicants have to do in the form of extra studies in order to satisfy the entry requirements. The programme content and its deepening nature effectively means that in practice only students from the Cycle 1 BSc Vehicle Engineering programme at KTU can gain entry to the programme (see also p. 2.1.2).

The Reviewers considered that more could be done to encourage students to seek admission to the MSc programme, especially from other universities. There is no information about courses which could enable graduates from other cycle 1 mechanical engineering programmes or from colleges to be admitted to the MSc programme.

5.2. Study process

Although the classes are scheduled during the day, the majority of the MSc students had full-time jobs and so many lecturers re-arrange classes after 5 p.m. which allows students to combine their study with full time professional work. In order to reduce student drop-out caused mostly from difficulties in combining study and work the academic staff are helpful in providing the possibility to study according to a student's individual availability. However, the Reviewers were concerned that the number of (stated) academic hours for the students each week should not be compromised by this arrangement.

Because practically all students of the second cycle (MSc study) are employed, difficulty in combining study with professional work is the main cause of drop-out. However the quoted drop-out of 25% is lower than in some other Higher Education Institutions in Lithuania. The Reviewers were satisfied that the staff efforts to support the MSc student through a flexible study schedule (see p. 5.2.1) were successful in limiting the student drop-out rate.

The mobility of the students on the cycle 2 programme is low. During the period under assessment only 1 MSc student took part in international exchange via the Erasmus programme, even though the students are encouraged by the staff to study abroad. The main reason given by the students for their low interest in participation in international exchange was a fear of job loss resulting from long leave. Such economic realities are difficult to overcome. Students, graduates, and employers indicated that experience outside Lithuania and good ability with foreign languages (including Russian) should be encouraged.

5.3. Student support

There is a commendable enthusiasm from the staff to help the students in their studies to the extent that lectures for full-time students can and are re-arranged later in the day (evening) to accommodate full-time students who are working. This could be formalised in order to help encourage the students more.

A social support program exists, but it seems to be insufficient in that it does not help MSc students to avoid the need to combine study with full-time work.

5.4. Student achievement assessment

Assessment criteria were considered appropriate and relevant. There was no clear indication of the mark given for the coursework on display.

Feedback by the staff to the students about their marks for coursework during the semester was confirmed by the students to be efficient and useful.

There is a system which ensures the evaluation of the lecturers in delivering the study modules and thereby assessing the teaching quality. This was described by the students as being operated by the Students' Union on behalf of the University, and the students said that they saw evidence that the questionnaires do have a positive effect in quality improvement.

Organisation of a public defence procedure for the final thesis ensures a high standard of achievement in this important aspect of the programme. Participation in the examining committee by external representatives of social partners / industry / employers is very good and helps to ensure that the subject of the theses corresponds well with the practical needs of employers. However, having looked at a number of final project dissertations, the Reviewers wish to encourage more discussion and reflection in the Masters project dissertations.

The Reviewers were unable to comment on any system for assessment and recognition of achievements acquired in non-formal and self-education because there was no evidence of this either in the self-evaluation report or from the meetings undertaken. It would appear that this is a topic which would benefit from direction at a national level; it has become important in many other European countries over the last 10 years.

5.5. Graduates placement

Although many graduates from the MSc programme are employed, those who met with the Reviewers indicated that finding a job in Transport Engineering, i.e. relating to the study profile could be very difficult. Despite the emphasis on road vehicle engineering especially automotive (cars) there was little evidence that the graduates use this knowledge and expertise in their subsequent employment. Students were concerned about employment in Transport Engineering. Employers whom the Reviewers met during the visit indicated that they have a limited need for Vehicle Engineering specialists and a greater need for more general mechanical engineers with a view to applications in their specific sector. Perhaps there should be more emphasis on other vehicles – aviation, rail or commercial? However, the programme obviously provides a thorough enough engineering graduate to be able to proceed to studying for a Doctorate or to gain employment in other industries, for which the Faculty and Department deserve great credit.

Comments:

The study process and student assessment of the MSc Programme in Vehicle Engineering at KTU has developed systematically. The reviewers would like to see more formalised academic support, increased social support, and international support (Erasmus, languages) for the students, and more formalised interactions between the Employers and the Department to ensure that needs are understood and addressed.

Recommendations:

Provide information to encourage more students from other cycle 1 programmes or from colleges to enter the MSc programme.

Formalise the arrangements for 'evening' (after 5 p.m.) study to make it clear that the programme delivery takes account of the needs of working students.

Increase student activity in mobility e.g. through ERASMUS.

6. Programme management

6.1. Programme administration

The programme management appeared to be thorough and effective. Students and graduates were very complimentary about the support they received from the academic staff.

6.2. Internal quality assurance

The self-assessment report for the MSc programme at KTU was generally well-written and presented. Quality improvement is managed through feedback from student evaluation of each module. It was not clear whether there was a 'stage' evaluation, i.e. an evaluation by the students of the whole year (or the whole semester). A 'stage' review can provide a useful overview of the way the programme integrates the modules and their learning outcomes.

Employers are very supportive, and seem to be engaged and involved. But they indicated that have well-developed ideas about their need for Vehicle Engineering specialists and jobs in their specific sector. Graduates seemed to have limited ambition which possibly reflects the economic reality in Lithuania. Both groups of stakeholders indicated that they had quite a lot of informal contact with members of the Department, and would welcome more formal contact e.g. to discuss the curriculum at a strategic level, to match learning outcomes with business and employment needs.

Comments:

The programme management has developed systematically. The reviewers would like to see more student feedback relating to each 'stage' of the programme, also more formal engagement with stakeholders.

Recommendations:

Provide a mechanism for more formal contact between graduate and employer stakeholders to discuss the curriculum at a strategic level, to match learning outcomes with business and employment needs.

III. RECOMMENDATIONS

Programme aims and learning outcomes:

1. Develop a general vision for the programme which includes the needs of employers, and the needs, expectations and aspirations of staff and students.
2. The Department should meet more formally and regularly with its (very supportive) stakeholders (viz. Graduates and social partners) e.g. to identify opportunities for specialist subjects which do not seem to be in the Department's vision for the programmes. Despite the emphasis on road vehicle engineering, especially automotive (cars) there is little evidence that the graduates use this knowledge and expertise in their subsequent employment. Perhaps there should be more emphasis on other vehicles – aviation, rail or commercial?
3. The Faculty staff should make more use of information from the University procedure for study programme assessment in the Faculty within which learning outcomes are also discussed and improved. The lecturers, students and social partners participate in the procedure; and the employers can feedback into the learning outcomes about real industry demands for specific knowledge and skills of graduates. An example would be the provision of a 'stage' evaluation by the students of the whole year (or the whole semester).
4. More discussion and reflection in final project dissertations, especially Masters should be encouraged, and Learning Outcomes should be reviewed to support this.
5. Communication, in written and verbal form, should be specifically included in the Programme and Module Learning Outcomes e.g. under 'General transferable abilities and skills' (D).

Languages, especially Russian, are strongly encouraged by social partners. Generally the teaching of communications should be enhanced, e.g. by teaching in foreign languages.

Curriculum design:

6. Improve the curriculum design by further refinement in the following areas:
   - Review the close linkage between the BSc and the MSc programmes to make it easier for graduates from BSc studies other than Vehicle Engineering at KTU to enter the MSc programme. Review and formalise the need for such students to complete 'obligatory' subjects before admission.
   - Increase the number of credits available for university defined and student self-elective subjects to bring it into line with the national recommendation for new programmes.
   - Include the module descriptors for the elective modules in the self-evaluation report.
7. Consider incorporating in the curriculum an 'integrating' module where knowledge gained over a number of specialist modules is drawn together to a single application example.
8. Review the role and time of practical application work in each part of the integrated BSc and MSc programme.

Staff:

9. Address the under-representation of female academic staff in the Department at Faculty level in planning for staff composition and turnover. Review academic staffing strategy relating to the external refreshment of staff.
10. Staff should take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme where there is no direct impact on the institution's financial resources.
11. Facilitate and encourage academic staff to undertake more professional development in terms of international exposure and experience, and gain more industrial experience. As part of this staff should improve their English language skills.

Facilities and learning resources:

12. Identify and promote to the students during the programme studies the links between research activities, associated facilities and equipment, and the MSc programme studies.
13. Review the 'opening hours' of the library facilities with a view to extending them.

Study process and student assessment:

14. Provide information to encourage more students from other cycle 1 programmes or from colleges to enter the MSc programme.
15. Formalise the arrangements for 'evening' (after 5 p.m.) study to make it clear that the programme delivery takes account of the needs of working students.
16. Increase student activity in mobility e.g. through ERASMUS.

Programme management:

17. Provide a mechanism for more formal contact between graduate and employer stakeholders to discuss the curriculum at a strategic level, to match learning outcomes with business and employment needs.

IV. GENERAL ASSESSMENT

The study programme *Vehicle Engineering* (state code 62403T102) at Kaunus University of Technology is given positive evaluation.

Table. *Study programme assessment in points by evaluation areas*.

No.	Evaluation area	Final
1	Programme aims and learning outcomes	3
2	Curriculum design	3
3	Staff	3
4	Facilities and learning resources	3
5	Study process and student assessment (student admission, student support, student achievement assessment)	3
6	Programme management (programme administration, internal quality assurance)	3
	Total:	18

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

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

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

4 (very good) - the area is exceptionally good

Grupės vadovas:
Team leader: Prof. Andrew Day

Grupės nariai:
Team members: Assoc. Prof. Jørgen Kristiansen
Prof. Mathias Paschen
Prof. Andrzej Reński
Dr. Vaidas Liesionis