STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO *TRANSPORTO INŽINERIJOS* STUDIJŲ PROGRAMOS (62403T104, 621E20003) VERTINIMO IŠVADOS

EVALUATION REPORT OF *TRANSPORT ENGINEERING* (62403T104, 621E20003) STUDY PROGRAMME at VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	***Transporto inžinerija***
Valstybiniai kodai	62403T104, 621E20003
Studijų sritis	technologijos mokslai
Studijų kryptis	transporto inžinerija
Studijų programos rūšis	universitetinė
Studijų pakopa	antroji
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	***Transport Engineering***
State code	62403T104, 621E20003
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 'Transport Engineering ' at the Vilnius Gediminas Technical University (VGTU) has been reviewed at the same time as the BSc programme "Transport Engineering" at the same University (VGTU). Vilnius Gediminas Technical University is a large well-established university with 8 faculties and 2 Institutes with Faculty rights.

Both the MSc and the BSc programmes are operated by the Faculty of Transport Engineering (founded in 1994), and the MSc programme has input from the Departments of Automobile Transport, Railway Transport, Transport Technological Equipment, and Transport Management, which also operates a separate MSc programme (Transport Management Economics and Management). The Faculty also has the recently formed (2009) Traffic Safety centre. The Dean of the Faculty reports directly to the Rector of the University, and the Faculty Board is the supreme body of Faculty management.

The MSc programme was registered in May 1997 and in 2002 external evaluation was carried out but the Self-assessment report gives no information or any feedback or subsequent actions or improvements relating to that review.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

1.1. Programme demand, purpose and aims

The Transport Engineering (TE) MSc programme is a 'deepening' programme with 80 credits over 2 years duration full-time. It has one ‚pathway' which is ‚broadening', viz. Transport Engineering Management. The programme language is Lithuanian. It has been designed "taking into account the aims set forth by the Bologna Declaration (1999) to create a common space for higher education with three cycles and having comprehensive and comparable degrees, in order to introduce study credit system. Lecturer and student mobility is encouraged in order to compare qualifications of the countries participating in the qualification process." The design of the programme includes preparing for continuation on Doctoral studies.

The strategic vision for the MSc programme is based on the long-term (until 2025) strategy for Lithuanian transport system development (2005) which includes transport development, environment protection, improvement of traffic safety, and strengthening of administrative skills. To achieve this more advanced technologies need to be introduced, more effective measures need to be implemented, and more qualified specialists are required. The mission of VGTU in this field, carried out by the Faculty of Transport Engineering, is to create, collect and disseminate scientific knowledge, educate specialists of highest qualification in the transport field, educate members of society, promote economic prosperity of the country, competitiveness of the economic activities, welfare, and high quality of life.

The objectives of the Transport Engineering study programme are to prepare employees with a good knowledge of transport systems elements and interactions, theoretical and construction principles, methods of operation, and of construction and transport technologies, and to prepare specialists who are able to plan and conduct scientific research into machinery and equipment. The aim of Automobile Transport Engineering is to specialize in the field of maintenance, development, effective and safe operation of automobiles; that of Railway Transport Engineering is to specialise in the field of maintenance, repair, development and safe operation of railway rolling stock; that of Transport Technological Systems Engineering is to specialise in the field of road building, stevedoring machinery and equipment, maintenance, development, and effective and safe operation of technological equipment of pipeline transport; while that of Transport Engineering Management is to specialise in optimal

management of transport companies, improvement and analysis of their structure taking into account the automobile maintenance needs in the area of business development. The aims of the study programme are "related to the mission of the university, coordinated with the needs of stakeholders and define the field of activity and professional activities for which graduates should be prepared".

The specific knowledge and understanding acquired in Cycle 2 Transport 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.

Other Cycle 2 Transport Engineering programmes exist in Lithuanian universities: Kaunas University of Technology (VGTU) offers an MSc in Transport Engineering which is "designed to prepare construction and production specialists", and the "main difference is that the VGTU programme is in the Faculty of Mechanics where a larger focus is placed on production processes and technologies". The VGTU MSc TE programme focuses more on "technical maintenance of machinery, diagnostics, safety, and analysis of operational parameters", and offers "a wider extent of specialization subjects". It is "more focused on the preparation of a future manager – organizer" with the specialization of Transport Engineering Management.

The MSc programme mainly admits graduates from the BSc VE programme at VGTU, but graduates from other universities may be admitted if they meet the entry requirements. The number of students admitted to the MSc Transport Engineering seems to be around 60-70 students each year (full-time, with no indication of recent admission of part-time students).

1.2. Learning outcomes of the programme

The programme learning outcomes are presented as "learning attitudes" in Table 1 of Appendix 3.5 of the Self-evaluation report. These are categorised under 4 areas:

- Knowledge (A);
- Cognitive abilities (B);
- Practical skills (C);
- Transferable skills (D).

The learning outcomes / attitudes are not, however, included in the module descriptors which are insufficient.

The contribution made by each study module to the Programme level learning outcomes is possibly defined on Table 2 of Appendix 3.5 of the Self-evaluation report. However, because this has only been partially translated into English, the relationship between the programme learning outcomes and the module learning outcomes is unclear.

The learning outcomes in Table 1 of Appendix 3.5 of the Self-evaluation report are poorly specified. They are too specific for generic learning outcomes and are not adequately connected with the aims of teaching at the MSc level. The learning outcomes do not include many elements which the Reviewers considered to be essential for an MSc (Cycle 2 programme), of which two serious omissions are:

(i) Communications skills;

(ii) Critical review and evaluation;

The Reviewers recommend that communication, in written and verbal form, should be specifically included in 'Transferable 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 not specified anywhere).

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. 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 states "know and understand the principles of optimization of constructions, processes and their parameters" and to this should be added "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 noted that the area of learning outcomes has been poorly developed and requires further work to meet expected standards. Discussion with graduates and employers indicated that a very important and well-evidenced learning outcome is the discipline and rigour embedded in the graduates by the programme. This gives strong career flexibility and represents a strong transferable skill.

Wider discussion of Faculty information, especially self-evaluation reports is encouraged; there were some omissions and mistakes in the reports which should have been identified and corrected.

Recommendations:

The way the programme and module learning outcomes are specified, written and used should be reviewed and improved as follows:

- The learning outcomes / attitudes must be included in the module descriptors; at present they are not and this is insufficient.
- The relationship between the programme learning outcomes and the module learning outcomes is currently unclear and must be clearly evidenced and explained.
- Communication, in written and verbal form, should be specifically included in 'Transferable 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 not specified anywhere).
- The principles of critical review and evaluation should be developed in all categories of learning outcomes (A) – (D). For example, learning outcome A4 states "know and under-

stand the principles of optimization of constructions, processes and their parameters" and to this should be added "be able to critically review them in order to select the most appropriate".

2. Curriculum design

2.1. Programme structure

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

Comparison of the MSc programme structure with the BSc programme in Transport Engineering at VGTU indicates that the aim of the MSc programme is to deepen knowledge gained from the first cycle (BSc) study (or broaden if the Transport Engineering Management pathway is selected). Subjects taught at BSc level are therefore not repeated in the MSc programme. The Reviewers agreed that the programme is indeed composed of subjects (modules) which are quite advanced although suitable in terms of the aims and the legal requirements. However this makes it more difficult for graduates from BSc studies other than Transport Engineering at VGTU to enter the MSc programme. It would appear that such applicants would need to complete extra subjects before admission.

Students can individualise their programme of study by specifying one of 4 study specialisms or 'pathways'; automotive, railway, transport technological systems (all deepening), and transport engineering management (broadening). In the first 3 pathways, semester 1 is common, and subsequent semesters are specialist. There are no further options within each pathway. The use of the same module title „Research work" for several modules is confusing and some differentiation in the title could usefully be provided. In the 4th pathway there are options which are available from semester 1. One module (4 credits) is allocated for elective subjects.

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). As a 'stand-alone' cycle 2 programme, the modules in each pathway are obviously related, and the 'Research work' modules look as if they will integrate the subjects studied in each pathway. This is good. The 4th pathway, Transport engineering management, is very different in content to the other 3. Staff were enthusiastic about what they saw as the strengths of the programme, and when asked, listed a wide selection.

The module descriptors do not specify the hours each week for lectures, practical work and laboratory work, although this is summarised in Table 3 of appendix 3.5 of the Self-evaluation report. The report states „The classes take the form of lectures and tutorials. We would like to have more laboratories for scientific research; however, there is lack of proper facilities and funds. We are looking forward to the construction of new facilities which are envisaged in the prospective university development plan". There appears to be little practical work in the programme and so it must concentrate on theoretical knowledge. The Department may wish to review the role of practical application work in the MSc programme.

The Reviewers noted that the automotive subjects do not appear to cover the engineering design and construction of vehicles, systems and components. They would have liked to see more engineering design calculations related to this aspect, and a larger emphasis on commercial vehicles (trucks).

Comments:

Overall the Reviewers observed that the area of curriculum design the area is exceptionally good in terms of the level of deepening content and the structure. It is a challenging programme.

Recommendations:

Review the curriculum design with particular reference to enabling graduates from BSc studies other than Vehicle Engineering at VGTU to enter the MSc programme. Review and formalise the need for such students to complete extra subjects before admission.

The Department should review the role of practical application work in the MSc programme.

There should be more engineering design calculations related to automotive vehicles, systems and components, and a larger emphasis on commercial vehicles.

3. Staff

3.1. Staff composition and turnover

The number of staff that the Faculty employs in delivering the programme, and their research activities associated with the field of Transport Engineering were not clear prior to the Reviewers' visit and meetings as the staff profiles and research publications in the Self-evaluation report were not translated from the Lithuanian. The specialist subjects are taught by 9 professors, 30 associate professors, and 12 lecturers and assistants of the Faculty. Each of them is a specialist in his subject. Female staff were under-represented in the group the Reviewers met and the Faculty is encouraged to develop strategies to improve this.

3.2. Staff competence

The Self-evaluation report states that „The subjects of the Transport Engineering study programme are taught by the lecturers of 3 faculties and 9 departments. Almost all of the lecturers are full-time and have scientific degrees and titles. The lectures are taught by experienced lecturers of high qualification…". Additionally young lecturers are involved in tutorials. The Reviewers met with members of the academic staff and this was broadly corroborated:

- Academic staff are highly qualified and experienced, and there are some younger staff in the Faculty whose careers are in the early stages of development;
- Some staff have practical experience related to the subjects they teach, outside the university;
- The Faculty encourages staff to work with industry;
- There are 8 Doctoral students in the automotive department (24 in the Faculty) who help with teaching of 'practical lectures' by supervising students.

Turnover of academic staff participating in the MSc programme appeared to take place mostly through progression from student to Professor. The majority of staff appeared to have completed their degrees at VGTU and have continued at VGTU on to an academic career. There did appear to be some staff who had joined the Faculty from a different background and the Reviewers observed that external refreshment of staff brings benefit to the Faculty. 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. There were no female lecturers in the group interviewed although the Reviewers were told that there are some female PhD students.

The level of international mobility of academic staff was relatively good (6 out of the 15 met by the Reviewers had been abroad in recent years). Even so, the Reviewers would wish to

encourage staff to take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme.

The University encourages and rewards increased academic qualifications of the academic teaching staff. As a result staff qualifications are recognised as high and exceed the national requirements. All subjects in the programme are taught by professors or associate professors, some of whom have significant research achievements. Many research papers have been published by academic staff who are encouraged to publish in English (as this is the de facto international academic publication language) in order to bring their work to a global audience. More professional development in terms of international exposure and experience, and industrial experience, is encouraged, as is the improvement of staff English language skills.

Comments:

The Department's staff appear to have developed systematically over many years and have distinctive features including research achievement. Staff development in the areas of practical experience, international mobility, and English language capability would benefit the programme. The representation of female staff in the Faculty needs to be reviewed.

Recommendations:

Address the under-representation of female academic staff in the Faculty by planning for staff composition and turnover.

Encourage staff to take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme. Academic staff should undertake more professional development in terms of international exposure, experience and industrial experience, also to improve English language skills.

4. Facilities and learning resources

4.1. Facilities

Premises for the studies of MSc students of Transport Engineering in Vilnius Gediminas Technical University are the same as for the BSc degree students and for the students of other programmes of the same Faculty. They are sufficient for the present number of students but new premises are needed as soon as possible. The Self-evaluation report complains of the size and arrangement of the facilities, including noting that the Faculty is "divided into two parts which are located at 10 km from each other". The Reviewers only saw one part of the Faculty facilities.

Computer facilities (the Reviewers visited one) were good and well-equipped with modern computers. Computer Aided Engineering provision was excellent with important software for general mechanical engineering and transport engineering available (AutoCAD, SolidWorks, PC-Crash). The Reviewers would however like to encourage the staff and students to use these facilities more (there appeared to be only very few final MSc dissertations in which this software is used and practically no BSc final reports with serious models or calculation using these programs). Also the Reviewers would like to see some access provided to alternative equivalent software, e.g. to use also Inventor in comparison with SolidWorks, and also an alternative Finite Element analysis system (e.g. ANSYS, Nastran) for stress calculations or vibration analysis.

The engines laboratory is well equipped; there are different test stands to test engines, including more sophisticated modern ones such as a rolling road. The electrical machines laboratory was very interesting and up-to-date. Well prepared methodological information was available for the students. The mechanics of materials laboratory was not visited but was available in a different Faculty. So in general the laboratories and equipment are good and the

Reviewers would encourage the greater use of these facilities and those in other Faculties to support the MSc programme (mechanical vibrations for example). The links between research activities and associated facilities / equipment with the MSc programme studies were not clearly evident.

The Faculty works with social partners to find practical placements for BSc students in companies but there does not appear to be any practical placement in the MSc programme. From the conversation with students, staff, graduates and employers no MSc students were working during their studies. The Reviewers would like to encourage the staff to increase the number of MSc projects done in collaboration with industry and social partners and include if possible some form of payment which will help and encourage students during their studies in university and subsequently in their employment.

4.2. Learning resources

The Faculty library (managed by staff of the Faculty) is small but the Reviewers learned that the main university library is much bigger, and contains a lot of applied technical literature in different languages. The opening hours are from 24 hours a day and 7 days a week which is very good. There is also good accessibility for the students to the 'e-library'. It contains books and periodical publications, including e.g. the professional magazine "Transport". Many of the publications and books are in other languages (English, German, Russian), and there were many books written by Faculty staff. Accessibility of various modern publications is good with an 'e-library' facility. The Reviewers would like to know if more books, textbooks and periodical publications in the field of Transport Engineering could be held in the Faculty library of instead of the main university library.

Learning materials are suitable and accessible but are more focused on railway and automotive engines. Since Transport Engineering involves a large range of various systems, the range of available learning materials should be wider, e.g. information about commercial vehicles, buses and pipeline transport. In general the learning materials are interesting and well prepared (especially in the field of railway engineering), and could be enhanced by preparing them in foreign languages which would help the Lithuanian students and make them acceptable and understandable for foreign students. This would open new possibilities to invite students from abroad and also to have in the university prepared learning materials for foreign educational institutions.

Comments:

The area of facilities and resources has been developed systematically. Even though there are some issues with locations, the MSc programme is reasonably well provided with premises, resources and equipment in comparison with universities elsewhere in Europe. The Reviewers would like to see more use of research facilities and resources in the delivery of the MSc programme.

Recommendations:

Encourage academic staff and students to use the CAE facilities more in final projects.

Use research facilities and resources more in the delivery of the MSc programme.

Increase the number of MSc projects done in collaboration with industry and social partners and include if possible some form of payment which will help and encourage students during their studies in university and subsequently in their employment.

5. Study process and student assessment

5.1. Student admission

Numbers of applications to the MSc course are not given in the self-evaluation report, but the Reviewers were provided with this information during the visit. Full-time student numbers on the programme are 129 in the current year, which represents a slight decline (10%) since 2006-07. Part-time numbers seem to have fallen to zero in 2009, and the Reviewers recommend that a strategic review to investigate and address this decline should be made. They also noted that the staff did not seem particularly concerned about declining student numbers.

Applicants can be directly admitted to the MSc in Transport Engineering without entrance examination if they have graduated from the VGTU BSc programme. As the studies in the programme are intended to deepen the knowledge, only the students having basic university education in the same field or having BSc degree in a similar field with the required minimum of specialty knowledge are admitted. If there is a lack up to 10 credits, the examinations of the subjects can be taken before the end of the first semester of Master's studies. Admission is carried out on the basis of competition; the criterion for admission is the weighted mean of the main studies, with additional points added for scientific activity viz. scientific publications. The competition according to the first position of the application was from 0.4 up to 2.07. The number of applicants to the competition is limited by the fact that only graduates from similar programmes can apply.

In the Self–evaluation report there is only limited information about the admission requirements for other candidates, namely 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 mean that in practice only students from the Cycle 1 BSc Transport Engineering programme at VGTU can gain entry to the programme. The Reviewers considered that more could be done to encourage students to seek admission to the MSc programme, especially from other universities. The Reviewers considered that although the system of admission is clear they would encourage the staff to look for new ways to motivate new students to enter, and recommend that this is included in the strategic review of admissions.

Demographics and declining student numbers suggest that some action by the staff is needed and we encourage staff to think strategically to start addressing this. The efficiency of enhancing the motivation of applicants and new students for MSc studies is very standard, e.g. Open Days and exhibitions. These actions can yield little benefit for the VGTU MSc study programme because students who did their BSc studies in the same faculty of VGTU know all about the MSc programme from the staff during their studies. It can be interesting for the students who studied BSc Transport Engineering in other institutions but such applicants do not directly meet the entry requirements and therefore they are not encouraged. The Reviewers did not meet any MSc students during the visit who did his BSc in another institution. So standard methods of motivation are not very effective and the Reviewers would like to encourage the staff to make some serious improvement to present activities.

Potential MSc students are always very interested to know about the possibilities of working during their studies. The Reviewers would like to recommend that the staff should encourage part-time students (why have part-time entrants decreased to zero?) by scheduling lectures and other work during the evenings or over a few days of the week to liberate more time for the students and to provide them the possibility to work during the day.

5.2. Study process

The programme schedule is designed to accommodate the geographical situation of the university. Different departments are located on two main sites which are about 10km apart.

The Reviewers noted that the lectures and other work are scheduled to minimize the need to travel between sites, but even so students have to do a lot of travelling. According to the Self-evaluation report the duration of classes does not exceed 5 hours a day and there should be opportunities for "windows" between the classes as well as evening classes. The students whom the Reviewers met indicated that some lecturers do in fact schedule work in the evenings

In the Self-evaluation report there is no information on MSc student dropout although the data provided during the visit suggests this is between 10 and 20% from 1st to 2nd year of the MSc. These data should be in the report which does, however, state that there are very few students who need to retake exams.

The mobility of academic staff is fairly good, while the mobility of MSc students looks very low (the Self-evaluation report says that 1 student has studied abroad between 2004 until 2009) and there are no students visiting from abroad due to language (lectures are available only in Lithuanian). However, the students interviewed said that 3 (not clear if MSc or BSc) had been abroad under the mobility scheme, and 1 lecturer had visited during last year. The mobility of staff and of students is very important and helpful for the general improvement and widening of view of all people. Visits by foreign students and lecturers is also very helpful but not widely available. A reason might be that the staff need to improve their foreign language capabilities, and also need to encourage students to improve theirs. Students suggested that more technical language support in the programme would be helpful.

5.3. Student support

Very detailed information about the studies, schedules, employment possibilities and so on are available on university's web site. Administration and staff of the programme are available for the students by e-mail and they also can apply to the Dean's office throughout the working day. There is a possibility to study according to an individual study programme, but this is used only in exceptional cases, and none currently.

VGTU Study Regulations provide for the possibility to repeat the course, suspend the studies upon student's request or due to an illness, but no longer than for two years and not more than twice and the total period of suspension of studies cannot exceed 3 years. The students have the possibility to get consultations and retake the examinations as required. This system looks very democratic and offers a lot of possibilities and chances for the students but in reality it doesn't appear to help to decrease the dropout rate so some special action is needed.

The award of scholarships is related to the students' results and the majority of students have scholarships. The value of a scholarship is relatively low but is related to the present financial situation in the country.

The number of hostels for student accommodation looks insufficient and there is no information about the price and quality of hostels.

5.4. Student achievement assessment

Assessment criteria are similar to other Lithuanian Universities. In the Reviewers' opinion the system is good and understandable for the students and lecturers. All results of assessment are published on the web. Students are allowed to be examined only if they completed all associated work. The final mark is equal to a sum of intermediate marks and their scope coefficient product. Students are permitted to be re-examined twice in the event that they failed during the session of examination.

Assessment criteria were considered appropriate and relevant but there was no clear indication of the mark given for the coursework on display. Examination and feedback to the students was confirmed as fast and efficient.

There is a system which ensures the evaluation of the lecturers in delivering the study modules and thereby assessing the teaching quality.

In the Self-evaluation report there was a good description of final thesis assessment but during the visit the Reviewers checked some final dissertations and some differences between the description of the assessment and the actual assessment was evident. Some final projects were very mathematical but the Reviewers would like to see more engineering in the dissertations, e.g. the analysis of problems using at least two methods (theoretical and experimental or obtained using FEM or other software). This was evident only in a few dissertations. Then two or more obtained results have to be compared each to the other; also found only in very few dissertations. Finally the Reviewers wish to encourage more discussion and reflection in the Masters project dissertations. This discussion or reflection is one of the most important parts of the final papers and students must demonstrate their ability to analyse the problem, obtain results and to take decision (for example, the theoretical model gives good correlation when measured frequencies were < 5000 Hz). There appears to be some lack of methodological information how to prepare the final dissertations because they were all limited in this respect. The Reviewers also thought that some of the dissertation marking was too generous.

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

There is no information on MSc graduate placement in the Self-evaluation report; it indicates that an employer survey was ineffective. There is only the information that 62.5% of BSc graduates have jobs while they are studying for MSc and all are working according to their speciality. Information on graduate placement is essential not only for the assessment of the programme but also for new students as encouragement and motivation. The Reviewers met 4 graduates with BSc degrees although all either had MSc degrees as well or were studying for MSc while working. Whilst the discussions were interesting, the Reviewers thought that these were not representative and certainly no substitute for graduate placement data. The Reviewers met 9 employers who between them employed many graduates from the programme. All of them (except one) were very satisfied with the graduates of the programme (it was not clear which were employing BSc graduates and which MSc). The representative of Lithuanian Railways was very satisfied and enthusiastic. All employers were very concerned about reducing student numbers and a potential shortage of qualified graduates in the future.

Comments:

The study process and student assessment of the MSc Programme in Transport Engineering at VGTU has developed systematically. The Reviewers would like to see more focus on student admissions which is weak, increased social support, and international support (Erasmus, languages) for the students, and a review of final project dissertation marking, methodology and content. Languages are formally taught in the first year and students were happy to improve their language skills themselves by using books and information sources in several languages. More data on graduate placement is essential.

Recommendations:

The Faculty staff should review what more could be done to encourage students to seek admission to the MSc programme, especially from other universities. To address the issue of declining student numbers strategic action by the staff is needed.

Academic staff should encourage part-time students by scheduling lectures and other work during the evenings or over a few days of the week to provide them the possibility of working during the day.

Provide more support for foreign language learning for the students, e.g. by providing lectures in foreign languages, and encouraging visiting lecturers.

Continue to work to reduce the student non-completion / dropout rate.

Review the final project report marking for standard and consistency (the Reviewers noted that some of the examples shown were generously marked).

6. Programme management

6.1. Programme administration

The programme management appeared to be effective. Students and graduates were very complimentary about the support they received from the academic staff. The Reviewers noted that programmes are said to be revised once every 2-4 years, and students, lecturers, administrators and employers theoretically are involved in programme review. But there is no formal clearly described procedure how it works. It is recommended that a formal procedure covering programme review is prepared and used in future.

6.2. Internal quality assurance

The self-assessment report for the MSc programme at VGTU was incomplete in its preparation with important data missing and some appendices not translated e.g. staff profiles. This should be improved for future reviews.

There appears to be no formal system for programme improvement; instead this is based on various meetings and opinions which are not collected and compared periodically. The Reviewers would like to see a clear annual or bi-annual plan of action with dates and the names of responsible people. In this way the university can work towards compliance with a quality management system ISO 9001 which states: “you must write as you do and you must do as you write”. Also students and graduates should be more involved in internal quality assurance.

Stakeholders are very well involved in the programme quality improvement. They participate in the final dissertation defence panel and also in the Faculty Studies Committee. This cooperation is very beneficial for the following reasons:

- preparing and coordinating study programs and modules;
- selecting information on professional skills of University graduates;
- investigating the demand for specialists;
- analysing and forecasting the development of regional industry.

Staff and employers also confirmed that they have meetings to discuss actual problems in industry which are related to the programme. This was especially pointed out by the representative of the Railway company who confirmed that there were such meetings almost every week. This is good, but would be much better if the programme were revised once every 2-4 years, and students, lecturers, administrators and employers were involved in programme review. But there is no formal clearly described procedure how it works so it is

recommended that a formal procedure covering programme review is prepared and used in future.

Comments:

The programme management has developed systematically. The Reviewers would like to see a formal procedure prepared and used to cover programme review. Cooperation between the Faculty / University and industry is good but informal. For the next review the Self-evaluation report should be better prepared.

Recommendations:

A formal procedure covering programme review and programme improvement should be prepared and used in future with a clear plan of action as an outcome.

Cooperation between the Faculty / university and industry should be formalised.

III. RECOMMENDATIONS

Programme aims and learning outcomes:

1. The way the programme and module learning outcomes are specified, written and used should be reviewed and improved.
    - The learning outcomes / attitudes must be included in the module descriptors; at present they are not and this is insufficient.
    - The relationship between the programme learning outcomes and the module learning outcomes is currently unclear and must be clearly evidenced and explained.
    - Communication, in written and verbal form, should be specifically included in 'Transferable 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 not specified anywhere).
    - The principles of critical review and evaluation should be developed in all categories of learning outcomes (A) – (D). For example, learning outcome A4 states "know and understand the principles of optimization of constructions, processes and their parameters" and to this should be added "be able to critically review them in order to select the most appropriate".

Curriculum design:

2. Review the curriculum design with particular reference to enabling graduates from BSc studies other than Vehicle Engineering at VGTU to enter the MSc programme. Review and formalise the need for such students to complete extra subjects before admission.
3. The Department should review the role of practical application work in the MSc programme.
4. There should be more engineering design calculations related to automotive vehicles, systems and components, and a larger emphasis on commercial vehicles.

Staff:

5. Address the under-representation of female academic staff in the Faculty by planning for staff composition and turnover.
6. Encourage staff to take more advantage of the opportunities offered by mobility schemes such as the Erasmus scheme. Academic staff should undertake more professional devel-

opment in terms of international exposure, experience and industrial experience, also to improve English language skills.

Facilities and learning resources:

7. Encourage academic staff and students to use the CAE facilities more in final projects.
8. Use research facilities and resources more in the delivery of the MSc programme.
9. Increase the number of MSc projects done in collaboration with industry and social partners and include if possible some form of payment which will help and encourage students during their studies in university subsequently in their employment.

Study process and student assessment:

10. The Faculty staff should review what more could be done to encourage students to seek admission to the MSc programme, especially from other universities. To address the issue of declining student numbers strategic action by the staff is needed.
11. Academic staff should encourage part-time students by scheduling lectures and other work during the evenings or over a few days of the week to provide them the possibility of working during the day.
12. Provide more support for foreign language learning for the students, e.g. by providing lectures in foreign languages, and encouraging visiting lecturers.
13. Continue to work to reduce the student non-completion / dropout rate.
14. Review the final project report marking for standard and consistency (the Reviewers noted that some of the examples shown were generously marked).

Programme management:

15. A formal procedure covering programme review and programme improvement should be prepared and used in future with a clear plan of action as an outcome.

IV. GENERAL ASSESSMENT

The study programme *Transport engineering (*state code – 62403T104) at Vilnius Gediminas Technical University 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	4
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:	19

*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

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