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KLAIPĖDOS UNIVERSITETE
LAIVŲ PROJEKTAVIMAS IR STATYBA
(62603T102, 621H52001)
STUDIJŲ PROGRAMOS

VERTINIMO IŠVADOS

EVALUATION REPORT
OF NAVAL ARCHITECTURE AND MARINE ENGINEERING
(62603T102, 621H52001)
STUDY PROGRAMME
at KLAIPEDA UNIVERSITY

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Laivų projektavimas</i>
Valstybiniai kodai	62603T102, 621H52001
Studijų sritis	technologijos mokslai
Studijų kryptis	transporto inžinerija
Studijų programos rūšis	universitetinė
Studijų pakopa	antroji
Studijų forma (trukmė metais)	ištęstinė (2)
Studijų programos apimtis kreditais ¹	80
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Transporto inžinerijos magistras
Studijų programos įregistravimo data	2007-01-29

¹ – vienas kreditas laikomas lygiu 40 studento darbo valandų

INFORMATION ON EVALUATED STUDY PROGRAMME

Name of the study programme	<i>Naval Architecture and Marine Engineering</i>
State code	62603T102, 621H52001
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	29-01-2007

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

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I. INTRODUCTION

The Master Degree study programme „Naval Architecture and Marine Engineering“ (NA&ME) is supervised by and carried out in all stages under the responsibility of the Ship Engineering Department at the Faculty of Maritime Engineering at Klaipeda University (KU). The study programme has a potentially strong relationship with the Fleet Technical Operations (FTO) programme (State code 62403T101) and the Fleet Technical Operations Management (FTOM) programme (State code 62603T101), which are both implemented by the Maritime Institute at KU. Naval Architecture and Marine Engineering generally refers to the design and construction of ships including the large variety of complex and highly interfaced systems on-board.

Klaipeda University (KU) was established in 1991 and offers Cycle 1 (BSc), Cycle 2 (MSc), as well as PhD-programmes across a large field from humanities to natural sciences, engineering, and life sciences. The University comprises 8 independent science and study areas with their associated study programmes, which are 7 Faculties and the Maritime Institute. The University also incorporates the Institute of Continuing Studies, which provides a range of qualification training to higher school programmes in the humanitarian and social science fields. The Naval Architecture and Marine Engineering programme (hereinafter called the NA&ME programme) is a two-year full-time study programme equivalent to 80 national credits. The programme language is Lithuanian.

The programme registration date is 29-01-2007, and the programme was evaluated in 2001 by (external) experts. During the following years 2002 - 08, improvements were made to the programme according to the recommendations made by the experts concerning the identified weak points. No further information about the 2001 evaluation is given in the self-evaluation report, and the current Reviewers team has not seen the 2001 evaluation report. The 2010 year self-evaluation report for the NA&ME programme has been completed by a self-evaluation team in the Ship Engineering Department of Klaipeda University.

Generally the self-assessment report gives a fair description and evaluation of the study programme. However, the learning outcomes of both study programme and each course (module) could be more accurately described in future self-assessment reports.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

1.1. Programme demand, purpose and aims

Naval Architecture and Marine Engineering generally refers to the design and construction of ships including the large variety of complex and highly interfaced systems on-board. However, the modules (subjects) of this MSc study programme at Klaipeda University are overridingly focussed on engineering methods for design, construction and manufacturing of the ship's structure. Most of the modules fulfil the requirement profile of an adequate scientific learning opportunity of a European University. The wide variety of mechanical systems, propulsion systems, systems for handling cargos on-board, electrical systems and others are not covered in the programme. That it is a pity because a deeper cooperation with the Maritime Institute of Klaipeda University could lead to a wider range of relevant subjects and pathways within this MSc study programme.

Klaipeda University is the only university in the Baltic States which offers a Master Degree study programme in the subject of Naval Architecture and Marine Engineering. The self-evaluation reports states that the „goals of Naval architecture and marine engineering Master study programme comply with (the) common goals of Klaipeda University, that (are) as follows:

- *to prepare engineering and maritime economics specialists and scientists of high qualification able to perform intellectual and creative activities;*
- *to create favourable conditions for a person to acquire higher education based on scientific researches and conforming to the level of most updated technology;*
- *to propagate the idea of Lithuania as the maritime state seeking for its implementation by practical activities, to educate society, especially young generation, in a spirit of a maritime nation;*
- *to stimulate the development of Klaipeda region and Western Lithuania by scientific performance.*“

Discussions between the Reviewers and employers & graduates confirmed that these goals were not only correct but were also regarded as being met by the stakeholders. During the Reviewers meeting with representatives from seven social partners, it was confirmed that the study programme was generally adequate, and there is definitely a market demand for the graduates. Representatives from shipyards referred that 35 to 50 percent of the employees in their companies are engineers. More than 25 graduates of this Master degree study programme have been recruited during the last seven years.

The Ship Engineering Department of KU is the only scientific institution in the Baltic States (Lithuania, Latvia and Estonia) which offers education to both ship designers and shipbuilders. In the Reviewers' opinion, and based on the study subject descriptions, the NA&ME programme is offering mechanical engineering based studies with very focused subjects and correct aims and objectives relating to shipbuilding.

The demand for graduates from the Faculty of Maritime Engineering at KU mostly results from the demand of Lithuania maritime industry located in the coastal region. The Naval architecture and marine engineering MSc study programme is oriented towards preparation of top quality engineering and scientific staff for shipbuilding and ship repair enterprises, specialised laboratories, research and developing centres, ship classification companies, and for work at higher education institutions. The majority of graduates work in companies and firms belonging to the Association of Lithuanian Shipbuilders and Ship Repairers.

After finishing their MSc studies the graduates are free to choose jobs not only in the shipbuilding or ship repairing field but also in a large range of metalworking companies (welding engineers, ship classifying companies etc.). However, there is no information about changes of the employers' needs for specialists in the labour market as a result of the decline in demand for new ships during 2009. Such statistics should include information about in which countries graduates are working after finishing their studies. From the employers and graduates point of view, the NA&ME programme is overall a good study programme. A lot of potential and new ideas came from these stakeholders to the Reviewers.

The study programme is unique in Lithuania, and therefore a direct comparison with similar national programmes is not possible. The only way to get reliable information is through a direct comparison with international master study programmes in “Naval Architecture and Marine Technology”, “Naval Architecture and Ocean Engineering” as well as “Ship Science” of well-known universities in many European, Asian, American countries as well as in Australia.

On the other hand, special national interests regarding the educational goals of the programme as well as the political priorities has to be kept in mind. The self-evaluation report declares that the well-defined main task of the programme is the education of „top quality specialists”, i.e. graduate engineers for the shipyards and the marine supply industry, with a practical foundation and associated practical knowledge and skills, to replace existing specialist who are nearing retirement age. Therefore, the study programme demands a high effort from the students in training on the application of engineering tools which are relevant for the local industry.

Information about changes of the study programme during the years since Lithuania entered EU (also before the programme was registered in 2007) is not provided and would have been helpful to the Reviewers.

The self-evaluation report mentions that research done by students following the study programme are applicable in industry companies of western Lithuania. However, the Reviewers recommend that focus is not limited to the industry of part of Lithuania. There is information about a special focus on welding, which is very relevant, but more details are required about studies in this field and about how much information the study subjects present about advanced welding methods.

1.2. Learning outcomes of the programme

The scope of the study programme is mainly focussed on a relevant but narrow field of ship building, viz. hull design, construction and manufacturing. A widening scope could be considered in relation to the overall technology of naval architecture. In this context the Reviewers could see that most of the modules of the MSc programme “Fleet Technical Operation” (State code 62403T101) which is carried out under the responsibility of the Maritime Institute of Klaipeda University has potentially strong relations to the MSc programme “Naval Architecture and Marine Engineering”.

Graduates of ship-building study programmes are typically needed by other metal working companies too. In this context the Reviewers recognised the information about a special focus on welding with interest. However the possible employment of graduates outside the maritime industry is not mentioned in the self-evaluation report.

Neither the Programme nor the module learning outcomes are presented or explained adequately. Programme learning outcomes („elaborated aims“) are listed in a Table on page 8 of the self-evaluation report under 4 headings:

1. Professional knowledge;
2. Practical competences,
3. Practical skills, and;
4. Transferable competences.

Practical competences and practical skills seem to be the same, and missing from this list is any kind of ‚cognitive skills‘, and omission which needs to be addressed. Although the list of outcomes is very extensive, it is seemed that very important knowledge and skill are missing on the list. Particularly it is not evident if the graduate from the study programme can design or participate in design of ships or their parts.

The „elaborated aims“ are qualified by a detailed breakdown list of individual competences and abilities which are too detailed for the purpose and should be revisited. There is no summary or table showing how learning outcomes from individual modules are distributed between modules, or integrated to meet the overall Programme learning outcomes. Coherency between the Programme learning outcomes and the Module learning outcomes is therefore not demonstrated. This is a serious shortcoming and the Reviewers recommend that this is addressed by the Programme Management Team. The Reviewers recommend that the learning outcomes of the study programme are explained more briefly and specifically.

Learning outcome 1. “Knowledge” should cover both ‘Knowledge’ and ‘Understanding’. Additionally the learning outcomes do not include one element which the Reviewers consider to be essential for an MSc (Cycle 2 programme), viz. Communications skills. The Reviewers recommend that communication, in written and verbal form, should be specifically included in 4. ‘Transferable competences’ . This learning outcome would, for example, be addressed by a language module, an ICT module, or by a module which involves teamwork.

One of the differentiating features between Cycle 2 graduates and Cycle 1 graduates is the ability of the former to critically review and evaluate not only their own work, but that of others as well. This is not specified anywhere and the Reviewers believe that the principles of critical review and evaluation should be developed across all categories of learning outcomes and specified as such. Additionally, the Reviewers would wish to see more evidence of discussion and reflection in final project dissertations.

Comments:

The implementation of Learning Outcomes in the NA&ME programme is weak and should be developed to a more comprehensive standard. It meets the established minimum requirements, but needs improvement.

Recommendations:

The way the programme management specify and work with learning outcomes should be reviewed and improved to address the issues identified here by the Reviewers. Learning outcomes should be more focused and clearly identified for each module, and then linked to overall programme learning outcomes. “Cognitive skills” is missing from the programme learning outcomes and two others which seem to be the same should be corrected.

A summary or table showing how learning outcomes from individual modules are distributed between modules, or integrated to meet the overall Programme learning outcomes should be developed. Coherency between the Programme learning outcomes and the Module learning outcomes must be demonstrated.

It should be ensured that learning outcomes reflect the Masters level; in particular the principles of critical review and evaluation should be developed across all categories of learning outcomes and specified as such. Also the structure and methodology of the dissertations (final dissertation papers) should be more clearly defined and there should be more evidence of discussion and reflection in final project dissertations.

2. Curriculum design

2.1. Programme structure

The study volume seems sufficient. It involves 80 national credits (3200 hours) distributed over 4 semesters, i.e. 800 hours workload per semester and 1600 hours per year.

The evaluation of the study programme structure is difficult because in the self-evaluation report there is no matrix to show the relationship between subjects (modules) and their sequences. Furthermore there is no table which shows which learning outcomes are realised by the particular subject (module). There are such tables in most reports from other programmes evaluated by the Reviewers.

The self-evaluation report states that: “*The study programme being a knowledge enhancing programme, the majority of subjects are the continuation of subjects provided during Bachelor’s studies.*” This suggests that the Master study programme is a ‘deepening’ programme in that it follows on from BSc studies, but no information is presented about the preceding BSc study, or prerequisites in the text of the self-evaluation report (prerequisites are stated in the module descriptors).

The study subject description needs to be revised. For example the list does not include any information about welding (in the description of programme is mentioned that there is special focus on welding but it is not directly indicated).

In the first semester the students have to learn simultaneously the modules *Ship Design* and *Computer-aided Ship Design*, (part 1) and *Ship automated design systems* (part 2). If the first

title is correct, then it seems to be difficult from the pedagogic point of view. The first module is typically the basis for the second module, because the user has to know the basics of mathematical modelling of computer-aided methods. However in case that the second title of the module is correct, the consistency is given.

The form or duration of examination for some modules is not always clearly specified (see for example “Ship propulsion systems” written/oral 3 hours respectively).

It is doubtful whether the master’s thesis is professional specialisation. The general aim of a final thesis is that the student gets additional professional knowledge and experience to analyse a special subject in the context of known solutions, to synthesise scientific methods of mathematical modelling, numerical simulation and experimental validation as well as critical reflection of the results, outcomes and findings. The special technical subject should be secondary in this context.

2.2. Programme content

To the best of their knowledge the Reviewers are satisfied that the NA&ME programme complies with the requirements of the Lithuanian legal acts. The study 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)”. There is one optional subject (in semester 3) but there is no information about what options there are. The graduates commented that “the programme did not have the freedom to choose their own topics”. This needs to be clarified and addressed.

The study programme is focused on a theoretical basis of knowledge transfer which is good to deepen the theoretical knowledge and understanding of students. The comprehensiveness and rationality of the study programme is appropriate from the theoretical point of view, but it should be moved closer to the production and practical application of theories and models. To ensure this, the Reviewers recommend that the students spend more time in laboratories, and that more relations are developed with the shipyards and associated shipbuilding and repair industry. The students and graduates interviewed also commented on the need for „more practical – too much theoretical“. Currently the number of hours for laboratory exercises appears to be low for Cycle 2 studies.

Some important topics appear to be missing in the study programme description. E.g. there is no link indicated to special marine legal acts (for example there is no information about links to the norms of ship classifying company rules). This shortcoming should be resolved.

Some modules are very wide in terms of their content. Generally it is a good idea to specify content as accurately as possible, otherwise students find the breadth of content too much to handle, which can adversely affect achievement in examinations.

The Reviewers’ meeting with graduates confirmed that the NA&ME programme provides the graduates with a good knowledge background, enabling them to get jobs in closely related technological areas. The graduates also commented that the possibilities for international exchange of students (e.g. through the ERASMUS programme) were low, although 1 graduate spent a year studying in Denmark.

The Reviewers’ view is that the structure and methodology of the dissertations (final dissertation papers) should be more clearly defined, and that the staff should be encouraged to emphasize the evaluation of the work by the student who prepared it. There is a clear need to include critical review and reflection and more discussion in the Masters dissertations.

Comments:

Overall the Reviewers observed that the area of curriculum design meets the established minimum requirements, but needs improvement, in particular to review the consistency,

coherency and progression of study subjects over the programme, and to review the range of study subject content.

Recommendations:

Some choice or options should be included in the programme curriculum.

The programme should be reviewed and developed where possible to provide more time in laboratories, and more opportunities for student practical work should be developed with the shipyards and associated shipbuilding and repair industry. This could also be done by letting the students solve practical problems in coursework, projects and the final thesis (Masters Dissertation).

Review the curriculum with respect to important specialist topics such as marine legal acts (e.g. the norms of ship classifying company rules).

3. Staff

3.1. Staff composition and turnover

There are 13 full-time teaching staff in the Ship Engineering Department engaged in the NA&ME programme including 3 Professors, 9 Associate Professors, and 1 Doctor of Technology Science. Detailed information was available on staff experience, competence and professional development in the report appendix; some (but not all) staff publish research reports in Lithuanian and publish research papers in international journals although some staff do not have many significant research publications. The number of female staff is exceptionally and impressively high, 8, and one female student was obviously encouraged to pursue an academic career in NA&ME.

Lecturers from other departments and faculties at KU also contribute to the NA&ME programme in their individual specialities, and also provide the possibility to use their research laboratory facilities. The Reviewers visited one such laboratory and found that the facilities were used by students in their final projects.

The turnover of staff is not mentioned in the self-evaluation report, but appeared to be relatively low. Retirement is quoted as the usual reason for staff change, and the self-evaluation report indicates that career development of new Doctors would replace retired staff. Whilst this is recognised as being good for career progression, the Reviewers wish to encourage new staff to join the Department from other universities if possible (recognising the uniqueness of the NA&ME programme studies in Lithuania of course).

3.2. Staff competence

All lecturers of the Ship Building Department have professor status and/or a doctoral (PhD) degree. Most did not graduate at Klaipeda University; some studied for their PhD-degree at foreign universities. The majority of the staff speak one or more foreign languages well. According to the self-assessment report, members of the academic staff have been involved recently in several international projects and commercial agreements.

The self-evaluation report and the Reviewers' meetings with staff indicated that some staff have practical maritime experience, a background from industry, international experience, or additional certificates of competence e.g. "European Welding Engineer". This is very good, but it is noticeable that this is limited to a few well-established members of staff. Accordingly the Reviewers recommend plans either to extend existing staff experience in the topic area, or to introduce new staff with this type of practical experience. Overall the academic staff represent a solid, well-qualified and highly professional competence of relevance to the study programme, but it is recommended that staff continue to have or develop necessary practical experience in the topic area.

The list of main scientific publications of the teaching staff is generally sufficient, but most of the papers were published only in local or national journals in Lithuanian language. As most of the international scientists and engineers publish in English language these papers will not be read outside Lithuania. The missing presence and recognition in international journals of the activities in the Lithuanian shipbuilding science may lead to a low attractiveness of the NA&ME MSc programme at KU for international students.

There appears to be a good amount of staff international activity (13 international visits or placements in 5 years), and 3 of the staff members whom the Reviewers met, had undertaken ERASMUS exchange. But again, it was noticeable that this is limited to a few members of staff. Lecturers have the opportunity to take a sabbatical semester. They should use this chance in order to continuously improve their international experience as well as their industrial competence. The Reviewers noted that international activity has significantly increased recently with increased participation in student and lecturer international mobility. Staff are able to participate in professional qualification or foreign language improvement courses under EU development programmes and participation in the project „Creation and Implementation of New Teaching (Learning) Methods and Forms in the Field of Technology Science“, financed by the European Social Fund and Lithuania. This is very good.

Comments:

The Department's staff appear to have developed systematically over many years and have some distinctive features including scientific and practical backgrounds in a unique and important technological area. Staff are enthusiastic and some are successfully engaging in research. This should be pursued and wider publication (in English) of research results should be promoted together with further staff development in the areas of research track record and achievement, international mobility, and English language capability. More students and staff from outside Lithuania should be invited to participate in the study programme as well.

Recommendations:

Ensure that staff continue to have or develop necessary practical experience in the topic area.

Academic staff should increase their publications of research outcomes internationally and should continue to engage in international exchange and activity.

4. Facilities and learning resources

4.1. Facilities

The premises for the MSc programme Naval Architecture and Marine Engineering at Klaipėda University are sufficient for the students because the number of students is very small (average of annually admitted students during the last 5 years has been around 8). However, the same premises are used for by students of other study programmes and also by BSc students, so it would be necessary to assess the overall usage of the facilities, which is not covered in the self-evaluation report. At present the premises of the University are in a diverse condition. Some of them are in poor or even in very poor condition. However much effort is evident for improving the situation. Some parts of the building are currently under renovation and modernization. Most classrooms are already in good condition. The self-evaluation report indicates that a new building will be constructed in the next few years, which will further improve the standard and capacity of the premises.

The Reviewers found that the classrooms are generally in good condition. The computer facilities and rooms are in good condition, and are equipped with a suitable number of computers. Computers as well as software seem to match the required standard and capacity both in terms of quality and quantity, and the computers are used for exercises, project work and self-study based on Microsoft-standard. A wide range of important CAE software for ship design and

general mechanical engineering is available (e.g. the list in the self-evaluation report includes Autoship, MATLAB and ANSYS plus a very interesting welding package developed in an EU consortium including members of the Ship Engineering Department). These computing systems allow the application of commercially available software to solve general computer aided engineering tasks as well as promoting computer based learning processes, e.g. commercial software for computer aided ship design and optimisation of hull shape, software for collecting and analysing data from experiments, tools for numerical simulation of selected scientific questions regarding ship's buoyancy and stability, longitudinal strength of ships, ship propulsion calculations including propeller diagrams as well as ship behaviour in a seaway. However, the Reviewers would like to encourage the staff and student to use it more (there appeared to be only very few final MSc dissertations in which this software is used).

The laboratory of fluid mechanics engineering is modern. A second laboratory is much older and covers the basics, e.g. ship buoyancy, stability and hydrodynamics. The laboratory of resistance of materials is well equipped with modern equipment. All the listed laboratories appear to be used by BSc students of mechanical engineering and transport engineering. For MSc students the welding laboratory was interesting and relevant; some of the teachers carry out research in this area and they obviously involve MSc students in this research (some MSc theses were reviewed which dealt with the subject of welding). This is very good, but for MSc students the Reviewers would like to see more specialised laboratory equipment for ship design and marine architecture. For example, the laboratory equipment of the Ship Engineering Department includes devices at a low level of mechanisation and only some state of the art computer controlled instruments. Whilst this simple equipment has educational value for basic studies and is used (and needed) for practical training, with the aim to deepen the understanding of elementary theoretical models which are generated and discussed in lectures, such devices are often capable of analysing one physical parameter only and is more suited to undergraduate studies.

The reason for an introduction of students into both handling and application of highly sophisticated laboratory equipment is multifaceted in general. Students have to be exposed to experimental methods which need the monitoring of more than one parameter simultaneously. They have also to learn how to calibrate sophisticated computer controlled instruments and to reflect measured data. Last but not least, students also directly use such equipment directly for experimental studies of physical phenomenon, in order to solve scientific questions e.g. regarding their Master Degree Thesis.

The Reviewers recognised that there are some deficits in highly sophisticated laboratory equipment in comparison to other European universities which offer Master Degree study programmes in "Naval Architecture and Marine Engineering". The Reviewers expect that the planned new building will eliminate the observed limitations of existing facilities and equipment.

Students and graduates indicated that the department helped them to find places in companies for practical work, and some final projects are industry related. From the meeting with students, staff, graduates and employers it appeared that several (4 out of 7) of the students were working full-time during their studies, in companies engaged in related technical work. The Reviewers recognise the value of the students' contact with companies and would like to encourage the staff to continue in research which is relevant to the local industry, and to encourage the students to participate in this research during their MSc studies at the university.

4.2. Learning resources

Methodical literature for Master Degree study programmes is collected in the central library as well as in the libraries of the faculties of the University. The library includes a good variety and quantity of relevant applied technical literature in different languages. The students said that the library opening hours included evenings and Saturdays which is very helpful because lectures for MSc students start at 5 p.m. since over half of them have full-time jobs. There is good accessibility to the e-library. The conditions for borrowing at the library are known by all users;

they are comparable with the rules in similar libraries which belong to departments in other European universities.

The Reviewers found many books written by the staff of Klaipeda University. Some books are available only in one or very few copies so that students are not allowed to borrow them for a longer period, but there is the option that the students can scan or copy important books. The Reviewers recommend that the library is encouraged and funded to continue to acquire more books, textbooks and periodical publications from other countries that are well known in naval architecture and marine engineering, such as Japan, Italy, USA. This applies especially to the field of ship equipment.

Suitability and accessibility of learning materials is sufficient, but the Reviewers found them more focused on ship hulls and engines. Considering that marine engineering involves also a very large range of various ship types and off-shore industry equipment, the collection of learning materials could be wider in the future. In general the available learning material is relevant and well prepared, but somewhat limited in scope for such a specialist programme of study. It is recommended to prepare some learning materials in foreign languages and make them accessible for foreign students. This can open new possibilities to invite students from abroad and also to present learning materials prepared at Klaipėda University to foreign institutions offering a similar education.

Comments:

The area of facilities and resources meets the established minimum requirements but needs improvement. The Reviewers did not see very much up-to-date laboratory equipment which relate specifically to Naval Architecture and Marine Engineering. Facilities will benefit from future investment (some investments are already planned) in postgraduate level equipment, which can be used for both education and research. More use should be made by the students of resources such as the CAE systems in final Master dissertations; the CAE systems are up-to-date and extensive. Because marine engineering involves a large range of ship types and off-shore equipment, the collection of learning materials could be wider. It would be desirable, if a clearer link between research facilities and resources in the delivery of the MSc programme was reflected in the self-evaluation report and with evidence in the final dissertations.

Recommendations:

More specialised laboratory equipment for ship design and marine architecture should be made available which are more suited to postgraduate studies. The Reviewers expect that the planned new building will eliminate the observed limitations of existing facilities and equipment. Facilities will benefit from planned future investment in postgraduate level equipment, which can be used for both education and research.

Staff and students should use the CAE facilities more in teaching and learning, especially in final projects.

The staff should continue in research which is relevant to the local industry, at the same time they should encourage the students to participate in this research during their MSc studies at the university.

The library should be encouraged and funded to continue to acquire more books, textbooks and periodical publications from other countries that are well known in naval architecture and marine engineering, such as Japan, Italy, USA. This applies especially to the field of ship equipment.

Some learning materials should be prepared in foreign languages for foreign students.

5. Study process and student assessment

5.1. Student admission

The annual number of students admitted to the study programme is small (i.e. around 8-10) and all admitted students seem to be KU BSc graduates in Transport Engineering (as established from the Reviewers' meetings) who are admitted to the study programme without any additional requirements. This number correlates with the number of State financed seats in the Klaipeda University Science Study Programme. The number of candidates who took part in admissions competition during the last 6 years was 10 - 15. The Reviewers consider that a good and clearly described system of admission is presented in the self-evaluation report, but recommend clarification whether the admissions process applies to any Transport Engineering BSc graduate from any other universities, or just from KU; prerequisites and preparatory study requirements. Since the programme appears to be a 'deepening' programme, the Reviewers would expect there to be some limitations on student achievement if they have not studied Marine Engineering before.

High performing students get state financed places. Students who apply to enter may be accepted, but if they do not get state financed places they often do not take up their place or drop out after the first semester, so state finance is important. The potential demand for educated graduates is based on regional development trends in an international context and social partners explained that the demand for graduates is higher than the annual number of graduates. However, because of the high tuition fees the number of students who pay for their studies is pretty low. That means there could be a basis for increasing admitted students if there were additional funding. The staff observed in this context that some employers financially support students.

The approach for enhancing the motivation of applicants and new students for MSc programmes is not the same as for BSc students. Most of the MSc entrants appear to be invited to study personally by department staff, and all MSc students appeared to enter from the KU BSc Transport Engineering programme; none from other universities. The opportunity to study and maybe work in new modern laboratories may motivate more students to apply, but the most important motivation for students to enter the MSc programme must be the knowledge from employers that MSc graduates are more valued and better paid in the companies than BSc graduates. The Reviewers consider that more effort should be put into encouraging admissions and publicising the programme, in Lithuania and outside. These could include consideration of the social constraints of Lithuanian students, limited publicity and promotion of the study programme by internet for example, and missing international offers to foreign students to visit the study programme and the Ship Engineering Department. In some cases there are opportunities for change by individual initiatives, and the Reviewers recommend that these are followed up.

Students explained to the Reviewers that sometimes they interrupt their MSc studies to take employment when they see a temporary advantage for themselves. It is possible that this could be turned to advantage by integrating studies more deeply with work.

The Reviewers found in the self-evaluation report a good record of graduate placement since 2004 which can encourage new students to continue studies to get good jobs in the future. The rate of graduates compared to students admitted has shown some fluctuation (from 70% in 2006 to 20% 2008) and in average it is not very high (average since 2005 up to 2009 is 55%), which means that motivation has to be improved. There are also no MSc students who completed the BSc in other institutions.

The Reviewers strongly recommend that the staff make more effort to increase the number of interested students, and to attract foreign students on to the NA&ME MSc programme at KU.

5.2. Study process

It is commendable that lectures start at 5 p.m. to help the majority of students who have full-time jobs. This is encouraging students to enter into MSc studies. Lecturers are also flexible and help the students individually in cases when they ask for help. Staff in laboratories are also available during longer hours, Duration of the examination period is 4 weeks which should be enough even for working students. The harmonisation of both tasks requires a strong self-discipline as well as high performance of the students.

Mobility of students is very low, with only 1 graduate admitting to a placement in Denmark. There is no recent participation of the students in the ERASMUS programme interchange; “the students are afraid to lose their jobs”!

5.3. Student support

Administration and staff of the programme contact students by e-mail at the beginning of a semester. Students get information from the KU website and via e-mails. The website of KU is quite interesting but more information about the lecturers’ research area would be useful, in order to make it easier for students to select final projects.

The system of scholarships is good and understandable to students as it clearly explains priorities and how they are related to study results. It is good that young families and socially supported persons can receive social scholarships, and low income families may apply for lower fees. Students may receive bonuses for scientific, art and university social activity, and there is also a good system of state credits. As in many countries this system is used more and more. There are hostels for student accommodation but none of the students interviewed used hostels.

The dropout rate from the MSc NA&ME programme gives some cause for concern. If the data in the table on page 22 of the self-evaluation report is to be believed, the average dropout each year since 2004 is around 50%, and there is no analysis or interpretation of this. In the meeting with the Reviewers, the staff emphasized what was mentioned in the self-evaluation report, viz. “education is very expensive and students leave for economic reasons”. Employers stated that the graduates were very valuable to them and in short supply. Do such companies help with student funding for their MSc studies? Could they be encouraged to do so? The Reviewers recommend that immediate action is taken to investigate the causes of student dropout, and a plan put into place to improve student completion.

The Reviewers recommend the staff of the Ship Engineering Department of the Klaipeda University to increase the amount of financed research projects (by the European Community or domestic as well as foreign enterprises) and to include students into projects as a temporally employed assistant like other European universities do. The students earn some money, they work together with their lectures in a research project and they get additional experience in research work.

5.4. Student achievement assessment

There is a detailed description of assessment procedures in the self-evaluation report, from which it appears that the assessment criteria are similar to other Lithuanian Universities and the system is good and understandable. Assessment criteria were considered appropriate and relevant. All assessment results are published on the website. Because there was no clear indication of the mark given for the coursework on display, the Reviewers could not ascertain whether the marking was consistent, therefore it was assumed that it was. 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. It appeared that the “*Qualification commission*” includes “*scientists, practitioners, professionals and possible*

employers” i.e. stakeholders but no employers interviewed appeared to have been involved in such a commission. The Reviewers were not able to comment on the results of final project dissertation assessment because no marks were available. The structure for the final paper of the Masters dissertation was not clearly specified and the assessment criteria were not specific. There was a general lack of discussion and reflections in the final project report in relation to the applied models and methodology, and about the findings and conclusions and the Reviewers wish to encourage more discussion and reflection in the Masters project dissertations. This aspect (also related to the learning outcomes) is essential in Masters final 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

The interviews with social partners also confirmed the statement presented in the self-assessment report that *“the Master Degree study programme assures good theoretical and practical preparation of graduates”*. The list of graduate placement was well prepared and represents an excellent employment record, thereby confirming the importance and relevance of the study programme. The same picture of graduate employment was communicated by the employers in the meeting with Reviewers; most of the graduates are working in ship design and marine engineering which is very good. The Director of the Klaipeda Port Authority explained how the Authority had taken on 25 graduates in 7 years, and found MSc students stronger than BSc students. The Reviewers considered that this level of interest from a major stakeholder and others should be formally harnessed in some way to help the department and the university to address some important concerns such as student admissions and dropout. The majority of the graduates interviewed by the Reviewers had got a job in the shipbuilding industry immediately after finishing their Master Degree programme studies. One of the graduates was starting as an external PhD-student.

Comments:

The study process and student assessment of the MSc Programme in NA&ME at KU has developed systematically and has distinctive features. The Reviewers would like to see more focus on student admissions with increased social support; more effort should be put into encouraging admissions and publicising the programme, in Lithuania and outside. Student international mobility (ERASMUS, languages) needs more emphasis. An investigation is required into the causes of student dropout, and a plan put into place to improve student completion. The methodology and structure of the final dissertation requires strengthening with more discussion and reflection in the dissertations.

Recommendations:

The programme staff should make more effort to increase the number of interested students, and to attract foreign students on to the NA&ME MSc programme at KU. More effort should be put into encouraging admissions and publicising the programme, in Lithuania and outside.

More exchange of students with other countries (e.g. through the ERASMUS programme) should be encouraged.

Immediate action is recommended to investigate the causes of student dropout, and a plan put into place to improve student completion.

Interest from stakeholders should be formally harnessed in some way to help the department and the university to address some important concerns such as student admissions and dropout. More communication (in a formal sense) between employers, staff and students should be encouraged.

This would help deliver a better educational experience for all, particularly in the form of an improved study programme and more focus on practical issues. The very strong support to the programme from industry and graduates provide potentials for new ideas to be considered by the study programme and for a more close cooperation with industry.

6. Programme management

6.1. Programme administration

The whole programme management process seems to be complicated from the description in the self-assessment report. The presentation of the practical organisation / management structure showed that there is less transparency regarding the roles and responsibilities for example “considered at the meeting of the Ship Engineering Department; coordinated with the Committee of Marine Engineering Faculty study programmes; approved at the meeting at the Committee of Marine Engineering Board”... “Self-evaluation of study programme is performed by the commission established by the head of the Department and approved by the Dean of the faculty.” Furthermore there is the supervisor for students’ final theses, a reviewer and the “Master study field qualification commission”. The jurisdiction of each executive level is diffuse.

There is no specific committee at the department or study programme level with the task to implement, assess, review and develop the study programmes; for instance such a committee could be headed by a programme coordinator and include representatives of academic staff, employers and maritime associations, and students.

The Reviewers noted that programmes are said to be revised every 2 years; considered at the meeting of the Ship Engineering Department, coordinated in the Committee of the Maritime Engineering Faculty study programmes, approved at the meeting of the Maritime Engineering Faculty Board. Students, lecturers, administrators and employers are in principle involved in programme review. Students, teachers, administration and employers are said in the self-evaluation report to be involved in the management of the programme, but it is recommended that students are involved more at programme level e.g. by feeding back suggestions for curriculum improvement to the programme for the next students.

Students and graduates were very complimentary about the support they received from the academic staff.

The Reviewers recommend that closer relationships with the study programme of “Fleet Technical Operation” at the Maritime Institute of the Klaipeda University should be pursued.

6.2. Internal quality assurance

The self-evaluation report for the NA&ME MSc programme at KU did not include some important information or analysis e.g. on admissions and dropout. This made it difficult to assess on these issues. The report appeared to have been compiled without any student input.

There is a formal system for programme improvement, which is based on staff meeting every second year to analyse prepared statistical data. This is good practice but the Reviewers would like to see a clear plan of action after each such meeting with dates of execution of each action and with the names of responsible people. During the next meeting the action plan should be reviewed and outstanding actions addressed. Also there must be some discussion about the usefulness of each action. In this way the university can work towards compliance with a quality management system such as 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.

The self-assessment report indicates that good and efficient contact is established with industry and potential employers of the graduates. This also provides a route for feedback to the study programme. The external stakeholders (graduates and employers) have repeatedly expressed

both their good relations to the Ship Engineering Department and their willingness to bring in their practical experience and competence into the further progress of the MSc study programme. External stakeholders and employers told the Reviewers that they provide lecturers with current engineering tasks which appear in their companies, societies and public institutions. Often these tasks provide the basis for student projects or Master Degree theses. The social partners are fulfilling a commensurate contribution to the advanced training of lecturers, as well as to the education and practical training of students.

Despite this high level of stakeholder interest, they only seem to be formally involved to a very limited extent in the programme quality improvement and this could be improved. Employers can participate in the final dissertation defence panel and also in the Committee of the Maritime Engineering Faculty, but it is not clear from the programme administration information presented in the self-evaluation report that they are involved any further. The Reviewers encourage the department staff to involve stakeholders more; such cooperation would be very beneficial for the following reasons:

- Preparing, updating and coordinating study programmes and modules;
- Providing information on the required professional skills of MSc graduates;
- Investigating the demand for specialists and helping with admissions and dropout concerns;
- Analysing and forecasting the development of regional industry.

Graduates and employers confirmed that they have had no formal meetings to discuss such issues with the programme management staff, but they (graduates and employers) do have meetings with individual staff members to discuss actual problems which are related to the study programme.

Comments:

The programme management has developed systematically and has distinctive features. The Reviewers would like to see a better defined programme management and more clarity in the university management relating to the programme, more notice taken of student feedback and more formal engagement with stakeholders, all of which will help for a further improvement of relevance, value, and quality of this Master Degree study programme. For the next review the self-evaluation report should be better prepared.

Recommendations:

The whole programme management process should be clarified and defined for future reviews. A specific committee at the department or study programme level should be established with the task to implement, assess, review and develop the study programmes.

Students should be involved more at programme level e.g. by feeding back suggestions for curriculum improvement to the programme for the next students.

Closer relationships with the study programme of “Fleet Technical Operation” at the Maritime Institute of the Klaipeda University should be pursued.

The department staff should facilitate more formal engagement with stakeholders, e.g. in the following:

- Preparing, updating and coordinating study programmes and modules;
- Providing information on the required professional skills of MSc graduates;
- Investigating the demand for specialists and helping with admissions and dropout concerns;
- Analysing and forecasting the development of regional industry.

III. RECOMMENDATIONS

Programme aims and learning outcomes:

1. The way the programme management specify and work with learning outcomes should be reviewed and improved to address the issues identified here by the Reviewers. Learning outcomes should be more focused and clearly identified for each module, and then linked to overall programme learning outcomes. "Cognitive skills" is missing from the programme learning outcomes and two others which seem to be the same should be corrected.
2. A summary or table showing how learning outcomes from individual modules are distributed between modules, or integrated to meet the overall Programme learning outcomes should be developed. Coherency between the Programme learning outcomes and the Module learning outcomes must be demonstrated.
3. It should be ensured that learning outcomes reflect the Masters level; in particular the principles of critical review and evaluation should be developed across all categories of learning outcomes and specified as such. Also the structure and methodology of the dissertations (final dissertation papers) should be more clearly defined and there should be more evidence of discussion and reflection in final project dissertations.

Curriculum design:

4. Some choice or options should be included in the programme curriculum.
5. The programme should be reviewed and developed where possible to provide more time in laboratories, and more opportunities for student practical work should developed with the shipyards and associated shipbuilding and repair industry. This could also be done by letting the students solve practical problems in coursework, projects and the final thesis (Masters Dissertation).
6. Review the curriculum with respect to important specialist topics such as marine legal acts (e.g. the norms of ship classifying company rules).

Staff:

7. Ensure that staff continue to have or develop necessary practical experience in the topic area.
8. Academic staff should increase their publications of research outcomes internationally and should continue to engage in international exchange and activity.

Facilities and learning resources:

9. More specialised laboratory equipment for ship design and marine architecture should be made available which are more suited to postgraduate studies. The Reviewers expect that the planned new building will eliminate the observed limitations of existing facilities and equipment. Facilities will benefit from planned future investment in postgraduate level equipment, which can be used for both education and research.
10. Staff and students should use the CAE facilities more in teaching and learning, especially in final projects.
11. The staff should continue in research which is relevant to the local industry, at the same time they should encourage the students to participate in this research during their MSc studies at the university.
12. The library should be encouraged and funded to continue to acquire more books, textbooks and periodical publications from other countries that are well known in naval architecture and marine engineering, such as Japan, Italy, USA. This applies especially to the field of ship equipment.
13. Some learning materials should be prepared in foreign languages for foreign students.

Study process and student assessment:

14. The programme staff should make more effort to increase the number of interested students, and to attract foreign students on to the NA&ME MSc programme at KU. More effort should be put into encouraging admissions and publicising the programme, in Lithuania and outside.
15. More exchange of students with other countries (e.g. through the ERASMUS programme) should be encouraged.
16. Immediate action is recommended to investigate the causes of student dropout, and a plan put into place to improve student completion in the NA&ME programme.
17. Interest from stakeholders should be formally harnessed in some way to help the department and the university to address some important concerns such as student admissions and dropout. More communication (in a formal sense) between employers, staff and students should be encouraged. This would help deliver a better educational experience for all, particularly in the form of an improved study programme and more focus on practical issues. The very strong support to the programme from industry and graduates provide potentials for new ideas to be considered by the study programme and for a more close cooperation with industry.

Programme management:

18. The whole programme management process should be clarified and defined for future reviews. A specific committee at the department or study programme level should be established with the task to implement, assess, review and develop the study programmes.
19. Students should be involved more at programme level e.g. by feeding back suggestions for curriculum improvement to the programme for the next students.
20. Closer relationships with the study programme of “Fleet Technical Operation” at the Maritime Institute of the Klaipeda University should be pursued.
21. The department staff should facilitate more formal engagement with stakeholders, e.g. in the following:
 - Preparing, updating and coordinating study programmes and modules;
 - Providing information on the required professional skills of MSc graduates;
 - Investigating the demand for specialists and helping with admissions and dropout concerns;
 - Analysing and forecasting the development of regional industry.

IV. GENERAL ASSESSMENT

The study programme *Naval Architecture and Marine Engineering* (state code – 62603T102) at Klaipėda University is given positive evaluation.

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

No.	Evaluation area	Final
1	Programme aims and learning outcomes	2
2	Curriculum design	2
3	Staff	3
4	Facilities and learning resources	2
5	Study process and student assessment (student admission, student support, student achievement assessment)	3
6	Programme management (programme administration, internal quality assurance)	3
	Total:	15

*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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Team leader:

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