



Final Study Programme Evaluation Railway Transportation Engineering (professional bachelor)

at

Vilniaus technologijų ir dizaino kolegija

Assessment report

4 May 2012

Assesment report of the professional bachelor study programme Railway Transportation Engineering. The final evaluation was carried out by **evalag** as part of the Updating Engineering field of Studies Group Electrical and Automation Engineering and Railway Transportation Engineering Study Programs and the Social Science Field Transportation Logistics Study Program Project, code VP1-2.2-ŠMM-07-K-01-049.



Vilniaus technologijų ir dizaino kolegija (VTDK) commissioned **evalag** with the final programme evaluation of the newly created professional bachelor study programme "Railway Transportation Engineering". The programme evaluation was carried out by an international expert team that assessed the study programme according to the Lithuanian quality assurance standards and the European Standards and Guidelines for Quality Assurance in the European Higher Education Area with the objective of accrediting and registering the programme according to Lithuanian higher education law and awarding **evalag**'s international quality label for study programmes.

1. Vilniaus technologijų ir dizaino kolegija (VTDK)

VTDK is a public Lithuanian non-university higher education institution that offers college level study programmes which are directed towards a professional activity. The college in its present form was created by merging several colleges in Vilnius in the fields of engineering and design – this gives the college its distinct profile.

According to Lithuanian law, college level higher education institutions (kolegija) offer full-time and part-time professional bachelor degrees that allow graduates to pursue a professional career. Master degrees are not offered. Graduates who want to pursue a master degree at a Lithuanian university need to complete one and a half years of bridge courses to meet the admission requirements.

VTDK has about 4000 students and offers 22 professional bachelor programmes in the fields of engineering and design in the following four faculties:

- Civil Engineering Faculty
- Faculty of Design
- Petro Vileišio Faculty of Railway Transport
- Faculty of Technical Sciences

The college's mission is to be a partner in the development of a sustainable society. On the basis of this mission the college has developed a strategic plan for its development and management. VTDK has recently been very active and successful in acquiring EU-funding. The college finished or still carries out a number of projects to renew its study programmes, to renovate its buildings, to update its equipment, to develop its staff, to collaborate with its European partner institutions and to develop its internal quality management.

The railway transportation engineering programme is offered by the Petro Vileišio Faculty of Railway Transport, which offers for its 1006 students five study programmes altogether:

- Rolling Stock Operation
- Railway Transportation Engineering
- Transportation Logistics
- Transport Information Systems
- Communication Links and Structures

Responding to the recent higher education reform in Lithuania and an employer's survey carried out by the college, the faculty completely updated and restructured the three first-named study programmes in order to adjust the programme contents to the demands of the labour market and to broaden the competences of the graduates.

The college produced the self-evaluation report according to the Lithuanian guidelines for new study programmes (yet-to-be implemented programmes) as outlined in Order # 1-01-18 and submitted it to **evalag**. **evalag** formed an expert team consisting of four professorial experts and one student expert:

- Christopher Bohlens, Leuphana Universität Lüneburg
- Prof. Dr.-Ing. Liping Chen, Fachhochschule Kaiserslautern
- Prof. Dr. Harald Gleißner, Hochschule für Wirtschaft und Recht Berlin
- Prof. Dr.-Ing. Haldor Jochim, Fachhochschule Aachen
- Prof. Dr.-Ing. Frank Lademann, Technische Hochschule Mittelhessen

The site visit took place on 5 to 7 March 2012 at VTDK. During the site visit the expert team met with representatives of the programme, the college administration, students, teaching staff, graduates and employers and visited the laboratories and seminar rooms used by the programme.

The expert team produced an assessment report of the programme with an accreditation recommendation which was submitted to **evalag**'s accreditation commission that took the final accreditation decision in May 2012.

From **evalag**'s side, the accreditation was coordinated by Harald Scheuthle with assistance of Katja Götzen.

4. Programme assessment

4.1 Learning outcomes

Current situation

The self-evaluation report describes programme goals and learning outcomes of the railway transportation engineering programme and links it with the curriculum. The learning outcomes describe professional knowledge and competences as well as general/soft skills. The programme description describes the learning outcomes and contents of each module or subject and gives detailed information on the content and working methods of the courses.

The programme intends to educate "railway transportation engineers who can plan and organize activity while performing design and maintenance work on railway signalization equipment, visual and safety systems, communication systems, stations, and lines while organizing and controlling the technological process of shipment by railway transportation and can, based on their qualifications, independently make technical decisions and successfully work under competitive market conditions and improve in their professional activity" (self-evaluation report, p. 8).

The programme was updated in 2010 in a project funded by the European Commission. The programme was updated by broadening the competences of the graduates and by including new technologies and teaching and learning methods in the curriculum in order to increase the competitiveness of the graduates on the labour market. Therefore, the two preceding programmes were joined in the new curriculum.

In updating the programme, VTDK took into account two recent studies on the demand of specialists in the railway transportation sector. The studies suggested a need of specialists trained in modern railway infrastructure and control technologies as the

who are able to cover these subjects. By broadening the programme the college would have the opportunity to provide practically educated specialists who are able to plan and maintain railway track infrastructure. Such specialists are – according to the information given by the college during the site visit – not educated in Lithuania at all and have to be brought in from abroad. Thus, a broadening and upgrading of the current study programme could close a gap on the Lithuanian labour market and support the country's position in establishing a transportation hub in the region.

The expert team encourages the college to closely monitor the economic situation in the Lithuanian railway sector in order to be able to react quickly in case of changes that may affect the employability of their graduates.

The expert team encourages the college to broaden the general studies concept by developing courses which offer key competences customised to the professional needs of an engineer and to emphasise creative thinking of the students. This could encompass methodological competences (e.g. professional writing and presenting as well as project management for engineers), soft skills/social skills (e.g. team-oriented communication, conflict management, leadership skills) and creativity (e.g. technical drawing with regard to finding several adequate technical options/solutions for day-to-day work). These courses could be offered as electives of the general studies part and, if necessary, adapted to all other study programmes of the college.

4.2 Curriculum design

Current situation

The curriculum is described in the self-evaluation report, the study plan and – more detailed regarding content and working methods – in the programme description. The curriculum is based on a total of 180 ECTS credits which is equivalent to 4800 working hours. 15 credits are devoted to general college study subjects, 135 credits are devoted to study field subjects and 30 credits to special study subjects among which nine credits are devoted to electives. The full-time programme covers six semesters with 30 credits each. The part-time programme lasts eight semesters with workloads of 21 to 24 credits.

The study field subjects include 36 credits of scientific basics for railway operation in the first two semesters and 12 credits of economics and law in the third to fifth semester. The curriculum covers altogether 30 credits of practices which are spread over the entire study period with 27 credits of different industry practices. 72 credits cover the core railway transportation subjects and modules including the electives. Three credits are covered by an applied research course and 12 credits are devoted to the graduation thesis.

The curriculum of the full-time programme has a high proportion of practice hours which reflects the practical and professional orientation of the study programme. Out of the 2422 contact hours, 825 hours are devoted to laboratory work and 1084 hours to lectures. The remaining hours are individual consultation hours and term papers. 2378 hours are devoted to individual work among which 310 hours are the main industrial placement. The part-time programme has the same distribution of credits with a higher proportion of independent work.

The curriculum covers the main subjects of the railway transportation engineering field and gives the graduates a solid foundation in the field. The general college study subjects are not subject related and cover humanities and social science subjects as well as language competences.

from a job at a company. According to the college, about 65% of the lecturers are employed full-time; the remaining 35% are part-time. 26 lecturers are involved in teaching the study field subjects for the railway transportation engineering programme.

The activities of staff members are chiefly confined to teaching. The workload of lecturers is 1548 annual hours, which approximates 18 teaching hours per week. The remaining time is used for consultation hours, preparation of teaching materials, staff development and scientific work. Fundamental scientific research, however, is not a primary task, as colleges in Lithuania are not supposed to engage in research activities. Nevertheless, the college encourages its staff to do applied research and supports projects proposed by staff members.

In general, professional development is the responsibility of each staff member, but the college also tries to support the professional development of its personnel. For this purpose, it attempts to acquire EU-funded projects in order to provide financial support for staff development. The funds acquired may for instance be used by lecturers for attending international or national conferences. Additionally, the college approves long-term internships by lecturers in companies and lecturer's efforts to acquire second master degrees in other fields. VTDK especially supports lecturers' ambitions to obtain Ph.D. degrees. The college is also engaged in Erasmus exchange programmes for teaching staff. Nevertheless, the lack of funding for staff development remains a general problem.

Teaching staff is evaluated by the college on a regular basis. The teachers write a yearly self-assessment report which is used for a gratification scheme. Every five years there is an assessment of each lecturer, which also takes into account the lecturers' efforts regarding their own staff development.

Assessment

The expert team considers the staff qualification adequate for offering a professional college-level study programme and for providing the students with a qualified learning experience. They appreciate the motivation of the teaching staff met during the site visit. The number of teaching staff appears to be sufficient for supporting the newly introduced consultation hours, too. The students confirm that the teaching staff is easily accessible for them.

The expert team supports the decision of the college directorate to support staff development and encourages the college to provide funding for it. The experts especially encourage the college to continue and strengthen its support for staff members who want to attain a Ph.D. degree.

Recommendations

The expert team encourages the college to further build on its highly motivated and qualified staff for the development of its study programmes. The staff should take the lead in introducing innovations to study programmes instead of chiefly following suggestions of employers.

vant databases may be useful to ensure the availability of the latest research topics for the programmes different subjects.

4.5 Study process and student's performance assessment

Current status

There are no specific admission requirements for the railway transportation engineering programme. For enrolment students need to have a high school diploma with two state exams. For an admission at universities three state exams are necessary. During the site visit the college informs the auditors that all applicants are accepted who meet the admission requirements. This is regarded as necessary because the college – as most other higher education institutions in Lithuania – suffers from a shortage of students due to an overall drop in the number of young people and high emigration. The study programme starts once a year in September.

The programme is offered in a full-time option and a part-time option. The part time option offers the same content but is spread over four instead of three years to allow students to work during their studies. The part-time programme offers the courses in three blocks at the beginning, in the middle and after the end of the regular semester, with a larger portion of independent work.

The study process is organised in groups of approximately 30 students. In the previous railway automation systems and the old railway operation programmes the college started in 2011/12 with one group of 22 respectively 25 students in the full-time programme one group of 25 respectively 44 students in the part-time programme.

The study process offers a variety of working methods such as lectures and seminars, laboratory work, independent home assignments, consultation hours and independent work. The teaching methods and its distribution are listed in detail in the programme description for each module / subject.

Each subject is concluded with a student assessment. The final subject assessment is composed of at least two different assessment forms and combined according to a predefined formula. This leads to a variety of different examination methods, e.g. written exams, tests, practical works, project reports and independent work, which assess different competences. The assessment methods and formulas used for creating the final marks are described in the programme description. The individual marks are assessed and processed by the lecturer of the subject and the final marks are then submitted to the faculty administration.

Drop-out rates are at about 12% per year (in the railway faculty as a whole). According to the faculty, the highest drop-out rate occurs in the first year. The faculty as well as the students see low motivation of student for the chosen subject, high requirements in basic science subjects, adaptation problems, difficulties to combine work and studies, financial problems and termination of studies to work abroad as main drop-out reasons. The renewed railway transportation engineering programme has now a larger proportion of individual consultation hours which may contribute to a reduction of drop-out rates.

The study programme includes – among other shorter internships or practical placements – an eight week internship (12 credits) in a company – mainly at the Lithuanian railway company. The students search their place independently but in case of need, the college provides support through their company contacts. Before the internship

largely well prepared. Due to the professional profile of the study programme the possibilities for continuing education are limited as bridge courses are necessary to start a master programme at a university.

Recommendations

In order to encourage and strengthen the international mobility of the students the experts recommend strengthening the English language education of the students and offering courses in English language in order to also attract foreign exchange students. Therefore, the English-language capacities of the teaching staff need to be strengthened. The experts suggest as a possibility to encourage lecturers to engage in staff exchange programmes. Another possibility would be to invite foreign guest lecturers who provide courses in English. This would also give students and staff the opportunity to get in touch with foreign approaches in the field and in foreign teaching and learning methods.

4.6 Programme management

Current status

Each study programme is run by a committee related to the faculty. The programme committee includes lecturers and students. It is responsible for the yearly improvement of the programme and coordinates the programme-related quality assurance activities. The college has a council with representatives from the social partners.

The college has a structured process to create and redesign study programmes that involves input from different stakeholder groups. First, the faculty decides whether they see the need for a new or redesigned study programme. Then, the college carries out research on labour market demand and the requested profile for the programme. For this purpose, an employer survey is used which is sent to individuals on different hierarchy levels of companies in the field for the designated programme. The survey asks questions about the knowledge and competences of graduates, language skills, basic study subjects and main study subjects. The faculty analyses the results of this survey which are then used by the programme committee to design the programme. In the next step, the programme committee defines the programme goals and learning outcomes and designs the subjects to achieve the desired learning outcomes. In this process, the relevant ministerial regulations (general and specific requirements, etc.) are taken into account. Ultimately, the committee designs a curriculum and assigns credits to the subjects. In the next step, the lecturers develop the contents of their subjects according to the specifications of the curriculum. Once finished, the programme committee discusses the curriculum and the individual subjects with the lecturers. The finalised programme is then discussed by the faculty board, and after it has been adopted it will be voted on by the academic board of the college before finally the programme can be presented for accreditation and offered to students.

The programme committee meets regularly and reviews the programme on a yearly basis. For programme improvement the college builds on initiatives of its lecturers, results of the quality assurance instruments and its close contact with its social partners. The recent programme renewal was carried out in close cooperation with employers in order to customise the programme content to the needs of the labour market.

The expert team also recommends a standardised process for the student course evaluations. The process should assure a clear and transparent feedback of the results to lecturers and students. The evaluation should be organised and carried out by an independent body or person in charge. The dean should only be involved to mediate and coordinate the follow-up of the evaluations.

The expert team recommends the college using the opportunity of the EU-funded quality assurance project to design and implement an integrated strategic quality management system that builds on the strategic objectives of the college and the study programmes, uses diverse sources of information to analyse the quality and derives and implements measures for improvement. The college needs to assure that the quality management system supports the lecturers in providing a good learning experience and reduces bureaucracy.

The experts invite the college to use statistics more systematically in its internal quality assurance processes, so that the capacities of the already build up quality management system can be fully used.

5. Overall assessment

In general the expert team assesses the professional bachelor study programme "Railway Transportation Engineering" positively. The college provides a solid education and prepares the students well for their future profession. The professional character of the programme is clearly described in the learning outcomes. Curriculum and study process are clearly structured and appropriate to achieve these learning outcomes. The programme management and the quality assurance seem to be appropriate to manage and improve the programme. The expert team values the close cooperation of the college with employers – mainly the Lithuanian railway company – in order to support the study process and to constantly develop the study programme and focus the competences of the graduates to the needs of the labour market. A great asset of the college is its motivated teaching staff and its excellent laboratory equipment. The efforts of the college in providing good learning opportunities are also valued by the students.

The expert team sees the main area for development in using the college's potential for innovation in order to proactively develop the study programme in the future. The experts see a potential to broaden the competences of the programme by including line design and track planning competences in order to fulfil the own ambition to provide a comprehensive railway transportation "engineering" programme for which the experts see the potential on the Lithuanian labour market.

In further developing the programme the college should assume the role of the leader and innovator and propose programme innovations that meet the future needs of the labour market. Therefore, the college staff needs to keep up with current trends in the academic as well as professional field for being able to react appropriately and prepare graduates ahead of time for changes in the professional and economic environment. The experts see further internationalisation of the programme by strengthening English language skills, increasing students and staff exchange in both directions and inviting foreign guest lecturers as one important element to induce innovation.

According to the expert team the renewed railway transportation engineering programme meets the Lithuanian requirements for programme accreditation. Therefore, the team recommends the programme for accreditation.