

Decision of the Accreditation Commission of AQAS

on the Bachelor degree programme:

- “Electromechanics”

offered by the Technical University Moldova

Based on the report of the expert panel and the discussion of the Accreditation Commission in its 59th meeting on 18th/19th of May 2015, the Accreditation Commission decides:

1. The Bachelors-level programme “**Electromechanics**” (**Bachelor of Science**) offered by the **Technical University Moldova** is accredited according to the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

The accreditation is **conditional**.

2. The study programme essentially complies with the requirements defined by the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and the European Qualifications Framework (EQF) in their current version. The required adjustments can be processed within a time period of nine months.
3. The conditions have to be fulfilled. The fulfilment of the conditions has to be documented and reported to AQAS no later than **29th of February 2016**.
4. The accreditation is given for the period of **five years** and is valid until **30th of September 2020**.

Conditions:

1. The transparency of the documents needs to be improved, specifically the main focus of the programme and the awarded title must be expressed in a clearer way, e.g. in the Diploma Supplement.
2. Learning outcomes must be described in the course outlines.

The following **recommendations** are given for further improvement of the programme:

1. The university should strengthen its efforts in attracting qualified students in order to maintain the high level of quality even with the demographic changes. The possibility of individual specialisation might be a good argument for students to decide for the programme.
2. The university needs the autonomy to increase the number of incoming students in order to offer specialisations with real elective courses. The university should discuss this point with the Ministry and also try to get more funding from industry.
3. The academic skills should be improved, especially the literature research skills and self-learning capabilities.
4. Research literature should be more easily accessible, i.e. the amount of literature should be extended and research literature should be up to date.

5. The faculty should increase the number of courses in English language; especially courses in technical English are recommendable. In addition, English literature should be used in courses. Collaboration with other universities could be helpful to broaden the access to English literature.
6. The faculty should establish an institutionalised cooperation with the employers (e.g. a committee) and with the alumni (e. g. an alumni association).
7. More practical skills should be developed, e.g. by extending the internships and/or laboratories especially in the field of automatisisation.

With regard to the reasons for this decision, the Accreditation Commission refers to the attached assessment report.



Experts' Report

on the Bachelor degree programme:

- **“Electromechanics”**

offered by the Technical University Moldova

Visit to the University: 26th/27th of January 2015

Panel of Experts:

Prof. Dr. Julien Provost

Faculty of Mechanical Engineering,
Technical University Munich, Germany

Prof. Dr. Alexandru Salceanu

Faculty of Electrical Engineering,
Technical University Iasi, Romania

Viorel Costea

CBN Electronics, Cluj – Napoca, Romania
(expert from professional field)

Asnate Kazoka

Technical University Riga, Latvia
(student expert)

Coordinator:

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1. Introduction

This report results from the external review of the Bachelor programme in “Electromechanics” offered by the Technical University Moldova in Chisinau, Moldova. The review is based on the criteria that were developed jointly as part of a TEMPUS project under participation of the Ministry of Education of the Republic of Moldova. They are based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) that were developed by the European Association for Quality Assurance in Higher Education (ENQA) and presented to the Bologna Follow-Up group in 2005.

The University produced a Self Evaluation Report (SER). The accreditation procedure was officially initialized by a decision of the AQAS Accreditation Commission on 18./19. August 2014. The Accreditation Commission nominated the before mentioned expert panel and the University did not raise any concerns against the composition of the panel.

After a review of the Self Evaluation Report, on 26th/27th of January 2015 a site visit to the University took place. On site, the experts interviewed different stakeholders and consulted additional documentation and student work. The visit concluded with the presentation of the preliminary findings by the group of experts to the university representatives.

2. Profile / Outcomes of the Programme

The Bachelor programme “Electromechanics” is oriented towards training electromechanical engineers with qualifications corresponding to level 6 of the European Qualifications Framework (EQF), with advanced knowledge in electrical engineering and skills in the design and manufacture of electric machines and electrical equipment and their integration into installations and automated production lines capable to autonomously manage the manufacture, deployment and operation of electromechanical equipment and systems.

The objectives of the study programme shall provide specialist training for area specific activities: innovative design of electromechanical systems and electrical equipment automated by integrated technologies; methods, processes and technologies of manufacturing machinery, performant electrical drives and equipment; methods and means of metrological and informational assurance, control and testing, automation and command, assurance of their efficient use; online methods of non-invasive diagnostics, repair and efficient operation of machines, electrical drives and equipment; implementation of modern energy and environmental policies, use of renewable energy sources.

Upon completion of the Bachelor level, the student shall be able to demonstrate the ability to generate new ideas and innovative solutions to known problems or situations. Professional competencies provided by the programme “Electromechanics” represent the knowledge, skills and competencies specific to professional activities in order to solve successfully the situations and problems of design, manufacture and maintenance of machines and other electrical equipment, as well as their integration into various electromechanical systems in terms of effectiveness and efficiency.

General competencies transcend the entire Electrical Engineering area and have a transdisciplinary nature (teamwork abilities, oral and written communication skills in the native language and in a European language, learning autonomy, openness to lifelong learning, solving problems and decision making, initiative and entrepreneurship, recognition and respect for diversity and multicultural aspects, application and development of professional values and ethics).

Following the SER, admission to the Bachelor programme shall be processed in accordance with the Regulation on the organization and conduct of admission to higher education institutions in Moldova, Cycle I - Bachelor, approved by order of the Ministry of Education (no. 369 of May 6, 2014) and the internal Regulation of TUM approved by the Senate. Admission is done on the basis of a dossier, in decreasing order of average grades, admission criteria being strictly linked to the results in high school years and the Bacculaureate exam.

Experts' Evaluation

There are clearly identifiable and consistent connections between the overall structure of the learning programme and the requirements resulted from the compatibility with other representative programmes already accredited in the Bologna system. The educational level of the bachelor programme is in accordance both with the European and National Qualifications Framework. The European Credit Transfer and Accumulation System (ECTS) is established in accordance with European standards, facilitating transfer and Erasmus-type exchange throughout the Union.

The title of the programme has clear correspondence with other quasi-similar programmes delivered all over European Union, with the real expectations coming from the enterprises and is definitely sustained by the contents of the curriculum. There are also considered inputs and demands coming from the real labour market presently existing in Republic of Moldova.

The present-day stage of the "Electromechanics" bachelor programme, but also considering its further development, is fully supported with respect to teaching and research by the existing framework provided by the Department (chair) of Electromechanics and Metrology, constituent of the Faculty of Power and Electrical Engineering at the Technical University of Moldova.

However, the transparency of the documents needs to be improved since the main focus of the programme is clearly identifiable but not expressed in the documents. The expectations are different if one expect this Bachelor programme (which also entitles to Engineer title) to be a final degree with an orientation toward direct employment in (local) industry or if this Bachelor programme is expected to be a preparation to further studies at Master level. Above, the awarded title should be expressed in a clearer way. Both could be clearly stated e.g. in the Diploma Supplement (**Finding 1**).

The selection process of the incoming students and the admission requirements are clearly defined and adequate, being consistent both with the regulations of the Moldavian Ministry of Education and with the actual practise in European Union. The average mark of Bacculaureate (exam unitary organised in Republic of Moldova) offers the same equal chances for all the potential candidates. However, the experts recommend that the university should strengthen its efforts in attracting qualified students in order to maintain the high level of quality even with the given demographic changes. The possibility of individual specialisation might be a good argument for students to decide for the programme (**Finding 2**).

3. Curriculum

The study programme "Electromechanics" takes 4 study years, respectively 8 semesters. The curriculum allocates ECTS credit points for each course. Thus, 1 credit point is allocated for 15 contact hours plus 15 hours of independent work. Training within a year allows the accumulation of 60 credits and upon completion of the programme 240 credits.

For specific knowledge and skills training the study programme "Electromechanics" provides several categories of courses that meet the requirements prescribed by the National Moldovan Framework. Thus, the share of fundamental courses is 51 CP, general courses 8 CP, socio hu-

manities courses 22 CP, compulsory specialty courses 89 CP and optional specialty courses 34 CP. 1140 hours (36 CP) are provided for internships, thesis development and Bachelor exams.

Teaching methods in the programme include 37% lectures, 19% seminars, 18% laboratory work, and 26% internships and thesis development. Student assessment includes examinations, tests, year papers and projects. All subjects are finalized with exams. Assessment in general courses also includes graphic control work.

The curriculum requires students to perform laboratory works, graphic-analytical works and case studies, which are designed to contribute to active learning of students. Carrying out the year works and projects for main specialty courses intends to contribute to training specific skills designed to obtain skills to design different machines and electric drives, industrial equipment and data acquisition equipment systems by the students. According to the SER strong cooperation with businesses in the area allow students to perform year-projects and Bachelor theses based on solving real problems from the national economy.

Experts' Evaluation

The content of the curriculum has been considered by the experts as consistent for a Bachelor programme in "Electromechanics". From an academic point-of-view, the amount of theoretical subjects (e.g. Mathematics and Physics) and applied subjects (e.g. Sensors and transducers, Control of electromechanical systems) is well balanced over the four years. From a job-market oriented point-of-view, the amount of theoretical subjects could be considered as too high. The contradiction between these two points-of-view could be solved by defining a clearer target for this Bachelor programme (see also discussion in chapter 2).

However, these two orientations are not incompatible if the right elective courses are offered to students so that they can choose their way according to their own goal. The current programme offers elective courses from the Semester IV to VI. Unfortunately, the limited number of students allowed in this programme does not permit to have several elective courses running in parallel. After the visit at the Technical University of Moldova, the experts identified that the choice for which elective course should be taught during the current semester is decided after discussion among students and selected according to the majority vote. The problem derives from the fact student number and funding is fixed by the Ministry so the university has only little influence. The university needs the autonomy to increase the number of incoming students in order to offer specialities with real elective courses. The expert panel recommends the University to discuss this issue with the responsible governmental entities for a larger "admission plan" so that they can offer several elective courses in parallel. A number of 60 matriculated students (admission plan should be higher to take into account those who register but do not attend) has been identified as a minimum in order to be able to offer two or three options in parallel over the different years of the study programme. In addition, the TUM should try to get more funding from the industry (**Finding 3**).

From the market-oriented point-of-view, the expert panel identified that the local industry is demanding for more experience in the domain of programming and control of programmable logic controllers (PLC among others). It has also been identified that students would like to use more professional software during their laboratorial experiments instead of open-source software. Two recommendations to satisfy this wish and even to open for more opportunities with limited material resource could be 1) to institutionalize partnership with local industry to have access to proprietary software licenses; 2) to open the fields of controllers not only to industrial PLCs but also to low-cost distributed controllers such as Arduino, Raspberry and Beaglebone platforms. This second option offers the advantages to be cost-efficient (for the University and for the students if they want to do more by themselves), and also increasingly applied in industry. After discussion with the students and the industrial partners, the panel of experts would also recommend to increase

the total duration of the internships. Regarding the employability of the students, the panel of experts identified that most of the students were offered a position in industry even before they complete their Bachelor studies. This is a good point and the University is recommended to emphasize these aspects to attract excellent students to register for this specific programme (see discussion in chapter 2).

The programme uses a credit point system to describe the student workload. The student workload is calculated for all elements of the programme. The calculation of the workload is transparent. There are procedures to monitor the student workload and to adapt the curriculum / the credits if necessary.

The course outlines are well documented with a description of the content, the student's workload, and the evaluation methods. However, no clear learning outcomes are presented. The reviewers recommend to specify, for each course, what are the intended learning outcomes and their levels (**Finding 4**) so that the students can easily identify the relevance of the course content for application in industry or for further master studies, as well as the level of expertise they will acquire regarding awareness, knowledge and expertise.

Globally the structure of courses with lectures, seminars, exercises and laboratory experiments is well-balanced and allows the students to apply the new theoretical knowledge on concrete examples and platforms. The teaching-, learning-, and assessment methods support to a large extent the exchange between theory and practical application as well as between research and teaching. During their studies each student has to undergo different types of activities that are assessed differently. The university practices a multi-methodological approach where lectures are followed by laboratory work and an accompanying seminar. The teaching staff believes that this approach helps students to understand the topics more deeply and that even fundamental courses are taught in an applicable way although the students and also employers would still like to have more impact on the practical activities (laboratory works, seminars). However, the academic skills should be improved, especially the literature research skills and self-learning capacities (**Finding 5**). In this respect, research literature should be more easily accessible, i.e. the amount of literature should be extended and research literature should be up to date (**Finding 6**). So far, the students have been offered limited access to recent books and online research databases; the panel of experts identified this point as an obstacle to the self-learning activities. The University is for example invited to collaborate with other universities to offer more access to recent literature to the students.

The transcript of records is clear and states the equivalence between the Bachelor diploma and the "Licentiate diploma" and the Engineer title.

Finally, regarding the international mobility, the panel of experts noticed the effort that has been done over the past years especially in establishing a structure that allows for international mobility of students. For example, learning agreements are signed between the outgoing students and institutions they are going to. Still, the number of students completing a semester abroad is decreasing over the last few years. However, it is important to point out that in the last years three students have received a scholarship to undergo studies in France and in the Netherlands. One measure to facilitate exchange activities is to increase the number of courses in English language; especially courses in technical English are recommendable. In addition, English literature should be used in courses. Collaboration with other universities could be helpful to broaden the access to English literature (**Finding 7**).

4. Student Support

Students of the specialty are granted places in student dormitories under general regulations, acting within the university. The University has 10 dormitories with 3022 places.

Career counseling at TUM is oriented towards providing assistance to: high school graduates to consciously choose the specialty of study; graduate students to successfully fit within their work after graduation, forming a successful career in perspective. For this purpose various forms of career guidance are used:

- Vocational guidance of high school students;
- Advisory assistance on employment after graduating from TUM;
- Extracurricular training of graduate students on professional career.

Recognition of academic results and qualifications obtained at other higher education institutions and outside the higher education system is supposed to happen in accordance with the Regulation on recognition, equivalence and authentication of studies and qualifications – which represents a binding national regulation and is based on the ECTS credit transfer system.

Experts' Evaluation

The general assessment regulations (types of the assessment during the course and the formula for calculating the final mark) are available in the course descriptions. More detailed assessment regulations are introduced to the students in the beginning of each course so that the students are well informed. The panel of experts has found evidence that there are several methods of assessment that are combined in different ways for the purpose of evaluating the results of each subject. The chosen methods of assessment are appropriate for the situations they are used. The forms of examination allow the students to develop and to be assessed not only in regard to their knowledge of the subject but also in regard to the communication, presentation, team work and writing skills. The final mark is calculated by including marks of, for example, the year projects, midterm exams and final exam. The assessment is performed by teachers responsible for each subject. In case of course projects and final thesis there is a public defence and the assessment is performed by a specially designed panel. The defence of the results of internship takes place in the form of a public presentation which is also evaluated by the public. The final (graduation) exam is organised as a combination of two exams and the defence of thesis. The exams are subject specific and the form and structure of the thesis follows the university and faculty level regulations for the final thesis.

Exams are organised according to the plan that is public to all the faculty members. All exams take place in the exam period. The results of the exams are published on the electronic platform. The responsibilities and structures with regard to the organisation of the exams are clearly defined. The organization of the exams is appropriate with regard to timing. Examination dates are published to the students with appropriate timing. Resits are offered in a suitable way.

There are no regulations to compensate for illness, disadvantages, absence or other mitigating circumstance. Nevertheless, students confirmed that the university staff is very supportive towards students. For example, it is difficult but possible to combine studies with a job outside the university and follow the regular plan of the studies and contact the teachers in time that is suitable for the individual student.

Analyses of the failed examinations and the distribution of grades are performed at the course level. For each lecturer in each semester/academic year there is a Dossier of the Course Holder that also contains a fact sheet of students' success analysis.

The panel of experts witnessed that there is an electronic platform which offers many facilities – course descriptions and course materials, tools for online management of internships, remote support and counselling especially during the internships, forums and chats, exam management and evaluations and surveys for students. Students use the electronic platform for sending their work to the teachers and teachers use it for inserting the marks.

The information about the programmes is available on the homepage of the university as well as communicated to the potential students during study fairs and visits to secondary schools. Due to the demographic situation (decreased number of secondary school graduates) it has become difficult to attract enough students and there is a bigger number of vacancies than the number of graduates therefore the university is putting much emphasis on the expected employment of the graduates and promoting the programme together with the employers.

The counselling and student advisory services in TUM are oriented mostly towards the intended employment of students. There are several types of career counselling, for example, vocational guidance of high school students, advisory assistance on employment after graduation, extracurricular training of graduate students. There is also a special type of counselling for the first year students where the students are offered supplementary courses for improving their knowledge in fundamental subjects (mathematics, physics etc.). On the programme level, advisory is available directly from teachers. There are set consultation/counselling hours but students can contact teachers via e-mail and phone anytime if there is a necessity. Student exchange is not that wide spread due to financial reasons. There are not many exchange students or students who have come to study from other universities abroad but in these cases university offers special guidance and individually tailored approach. There is also a number of social services available for the students. TUM provides medical services, accommodation, sports facilities, cultural services and catering facilities.

The system of practical placements is developed in a very detailed and supportive way. There is a number of agreements between the university (both on the university level and specifically on the faculty level) with the institutions who are willing to have students to undergo practical training in their company. For their internship students are able to choose a company from the list provided by the university as well as suggest new companies (there are both national and international companies). Students are assigned a supervisor from the university side which is responsible for arranging all the administrative issues concerning the internship as well as assisting the student. There is an agreement between the student, university (the responsible teacher) and the company that states the aim, content and outcomes of the internship.

As TUM uses the ECTS system, there are regulations for recognising credits at other higher education institutions and outside of the higher education institution. Students have possibilities for mobility to other universities and TUM is accepting and recognising degrees from other universities. As there are not many cases of mobility, there are also not that many cases where credits would need to be recognised therefore they are solved with an individual approach case by case.

5. Employability

In terms of the specific study programme, “Electromechanics”, it is defined as a branch of engineering that relies on converters and electromechanical systems for both the production and efficient use of electricity to drive the movement of equipment and machines in all spheres of human activity. Consequently, the study programme “Electromechanics” aims at training highly qualified specialists for the following professional activities: research, design and development of machinery and electrical drives, power electronics and electrotechnical equipment; electricity generation, including renewable energy; equipping installations and work machines with electric motors, electronic convert-

ers and motion control systems; automation of technological processes of industrial and agro-food production; operation and repair of electrical, household and office equipment, power tools.

Career guidance of the students of the study programme "Electromechanics" is carried out by the chair of EMM by organizing internships and visits to companies in the field, meetings with representatives of businesses and presentation of modern electrotechnical products. Partnership with business environment is supposed to allow promoting the image of many local and international businesses among students, including the endowment of laboratories with the latest equipment from sponsorships.

Furthermore, within TUM, the Information and Professional Guidance Centre has aims to provide information and assistance on youth professional guidance and placement of university graduates in the workforce. Traditionally, in autumn and spring, the Center organizes Job Fairs where companies and organizations that have job vacancies in engineering field are invited.

Experts' Evaluation

Moldova is a small country where the electric profile industry is not very well represented. In such a situation, it is justified to be worried about the employability of very specialized graduates as those of TUM and, in our particular case, those of the electromechanical profile.

The university tracks the employment situation of their graduates. During the site visit, the panel of experts was given documentation about the graduates of the class of 2013. The picture looks quite good. From a number of 18 graduates, 15 are employed in Republic of Moldova and two of them are abroad. Another document presents the result of a survey among graduate students, regarding the employment chances. In this statistic, the employment chances are estimated to be very good in over 33 % and good in over 57 % of the cases. The figures proof that the qualification acquired in the study programme is valid both on the national and the international labor market and that the graduates have to a large extent good chances on the job market.

A small country such as Moldova with a weak electric profile industry employs in the specific activities of electromechanics almost all of the graduates. Electromechanics is a qualification with a very large field of applicability: big or special electric motors, special electric drivers, irrigation pumps or mechanism for closing or opening a door, everything is or needs electromechanics. Not to forget that agriculture is a consistent part of Moldova's economy, and it needs a lot of specific support from electromechanics.

TUM has the largest network of partner organizations in the country. Over 300 companies representing the main branches of the national economy contribute to the organization of student internship and employment of graduates, and, a database system exceeding 10 thousand enterprises helps to find a job ("Kompas-Moldova" and "Varo-Moldova" platform).

Graduates receive a "Diploma supplement" in which consistent and detailed information is given about the qualifications and skills that the graduate achieved through the study programme. This information is useful to find the right place for the right person. Taking one step further, a graduate has to do more than looking for a 'ready-made' place to work. A significant part of the graduates intend to start their own business, for which they feel appropriately prepared. If someone has energy, courage and ability to start a business, the ideal place for it is not Germany, USA or France, it is Moldova or other similar East-European country, because they have significant growth potential. Related to this, during the discussions, one of the students declared that he intends to open his own business in the field of green energy. Such initiatives have a great success potential, as the field is expanding.

In order to prepare good specialists, it is important to have a strong background of knowledge and skills, including mathematics, physics, chemistry, basic electric theory, and at the same time fur-

ther skills demanded at the labor market. From the point of view of the labor market representatives there is a wish for more practical skills. The students and graduates also asked for more practical activities including laboratories, internships and applicable projects. The panel of experts shares this opinion that the curriculum is unbalanced in the favor of theory. In order to improve the quality of education, it is important to move the balance in favor of achieving more practical skills and academic skills (**Finding 9**, see also chapter 3).

On the other hand, the main goal, the bigger goal of EM, of TUM, and their graduates in general, is not only design or drive an electric motor, or solve a few problems of the industry of the country. The main goal is to become a motor, to design, to build and to drive an industry, to design and drive a country. We are discussing not about some specialized robots which need a power socket, maybe some pressurized air and work to do. We are discussing about people, people which need not only a place to work, but need to be integrated in society and even more, they have to build this society. So, the students have to learn not only about electric fields, they have to learn about democracy, about its institutions, about the justice system, about fighting corruption, secret services, and about how all these function together. Related to this, social sciences subjects have a special importance. The space reserved for social sciences classes (22 CP out of 240 CP) is appropriate. The study programme thus also contributes to the higher level of employability.

The panel of experts concludes that the study programme "Electromechanics" offers to a large extent the necessary knowledge and skills required from the market and the academic field.

6. Resources

The main sources for the organization and conduct of university study programmes are state budgetary resources, tuition fees for students under contract, national research programmes, international programmes and sponsorships offered by the business.

35 academics are involved in teaching in the programme. The staff scheme of the chair provides 16.24 teaching positions, of which over 70% are held by full-time staff leaving less than 30% for part-time staff. Of the total number of positions, about 52% of positions are filled by people with didactic and scientific titles.

Internal management promoted by head of the chair intends to raise the professional training level of electromechanical engineers, modernization of material infrastructure, setting partnership model relations with local businesses and the international academic world.

The chair has 10 teaching and research laboratories, a workshop, two warehouses, three computer rooms, 4 offices for teachers with an area of approximately 900 m². During the past years, renovation works of all enclosures were completed, and three new laboratories (industrial controllers, electrical equipment, renewable energy resources, digital measuring systems) were created. Beyond this, a library is available to the students.

Available for students of the programme are four computer rooms connected to the internet and four interactive electronic boards. According to the SER teachers of the chair were trained on how to use these intellectual boards. Additionally a number of teachers of the chair was trained within the Continuous Training Center of TUM on the use of informational and communication technologies in education (e-learning) obtaining a corresponding certificate. Consequently, when conducting surveys, students are interviewed on their opinion about the courses placed on the Moodle platform of TUM.

Experts' Evaluation

The Technical University of Moldova was founded in 1964 and the Faculty of Power and Electrical Engineering was among its founder members. Consequently, there is lots of experience and qualified staff in this field. Almost all staff is involved not only in the teaching programmes but also in research activities, respecting a sustainable balance between these two compulsory interests.

All staff involved in the teaching of the programme are documented including their academic and other relevant qualification as well as research activities and quantitative involvement (teaching hours) in the programme. It is ensured in the programme that the teaching capacity is available for the period of accreditation. If positions expire during the period of accreditation the position will be reappointed. For the part time lecturers involved in the programme, there is a procedure to ensure the qualification of the lecturers. There are procedures to ensure that lecturers are familiar with the requirements in the programme.

Every five years, all academic staff must go through an evaluation process aiming to maintain or even to advance their position. The main interest of the assessment is the course material that must be updated and improved. One point of appreciation is e.g. the effort done by many lecturers to provide courses in English, to use English bibliography or, at least, to accustom the students with English specific terminology. There have been developed procedures aiming to ensure appropriate training of the teaching staff, also including associate (part time) lectures for instance in the domains of project management, pedagogy, technical English or modern IC technologies (e.g. Moodle platform). The ranking obtained at the finalization of these courses is definitely considered when a promotion is decided.

Generally, the existing facilities are appropriate in terms of room and space required for the number of students enrolled. The university provides the students' access to information by internet. Regarding the access to research literature, the reviewers refer to the above mentioned evaluation (see chapter 3).

The didactical and research infrastructure is decent. There are new laboratories, cohabiting with older ones. In the framework of these newer, well equipped laboratories (like Renewable resources) there are carried out significant research activities in mixed teams: experienced researchers and young students.

7. Quality Assurance

According to Quality Management System (QMS) documents implemented and certified at TUM, the bodies responsible for the maintenance and management of the QMS are: (1) Management Representative in the area of Quality, (2) Senate Commission "Training and Quality Assurance Process", (3) QMS coordinator, (4) Quality Management Committees (QMC) are permanent structures of the Faculty Boards, and (5) The person responsible for quality assurance (at the chair level) has the authority and responsibility for quality assurance of all processes carried out within the subdivision (education, research, organization and external relations).

According to the SER, the chair is the main responsible person for continuous quality improvement. He/She ensures public transparency of data and information about all study programmes offered and those related to quality management. The chair schedules and applies immediate and long-term preventive and corrective measures in order to address non-compliances.

The following activities are examples of Quality Assurance measures carried out by TUM respectively the faculty:

- questionnaires of students and teachers(e.g. course evaluations, graduate surveys),
- permanent labor market surveys are performed in order to determine the kind of specialists required by the national economy, and
- annual organization of labor fairs.

Results are analyzed at all management levels and, depending on the views expressed, solutions are being sought to mitigate or to eliminate them.

Experts' Evaluation

Technical University of Moldova has developed a manual for internal quality assurance, which is strongly based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area, and all programmes are evaluated according to it once in 3-5 years based on the decision of the Senate. As there is no link between internal quality of higher education (of both institutions and study programmes) and decisions at the national level (Ministry of Education and Science), the increased level of internal quality does not have any external consequences (for example, increased number of state financed places, increased number of financing etc.)

In the Technical University of Moldova, the dean of each faculty is the responsible person for the study programmes in his or her faculty and there is a specific person on the level of chair responsible for the quality assurance issues. There is no written strategy for quality improvement but indicated problems and measures to improve quality are permanently discussed in the Senate. Furthermore, the university uses an information system to gather data about student progression and success rates, student satisfaction with their study programme, employability of the graduates and the evaluation of study programme by graduates, the institutions own key performance indicators, results of teaching staff and course evaluations.

There are several quality assurance mechanisms that are used to ensure the quality of the study programme "Electromechanics". Besides the university-wide instruments, the faculty has introduced specific measures. A dossier of the course holder exists for each course which includes several fact sheets, for example, the students' success analyses. It is the responsibility of each course holder to fill in the relevant fact sheets annually and analyse the results. Peer evaluations of the teachers and open lectures are introduced as a regular practice that ensures the exchange of good practices, gives support for young teachers and is used in the process of evaluating teacher performance e.g. for promotion or for defining the salary.

Regular feedback from students is ensured by questionnaires. The Quality Management Department of TUM is responsible for organising all the questionnaires. There are four types of questionnaires – questionnaires for the first year students, questionnaires for evaluating teachers, questionnaires for evaluating courses and questionnaires for graduates. All the results are gathered by the Quality Management Department and are distributed to different levels. Infrastructure issues are discussed at the administrative level, course issues are discussed at the faculty level. Questionnaires are published online on a specially designed system and teachers inform the students about the available questionnaires. The results of the surveys are made public to all involved people. Different collegial bodies (Senate, Administrative Council and Faculty Council) are responsible for the analysis of the data and, in case of shortcomings or problems, to find measures in order to solve the problems. The academic staff of the study programme and the students of the study programme "Electromechanics" described the questionnaires as effective. For example, in 2011 the number of theoretical courses was decreased in favour of laboratory works in the faculty as a result of the students' and employers' feedback.

After the interviews, the panel of experts identified several form of evaluations to assess the quality of the lecture content as well as the appreciation of the teachers. Also, the students consider that their comments are taken into account in order to improve the lecture content and to create new laboratory experiments. The expert panel noticed the good relations between the teaching staff and the students, as well as the tremendous amount of time and energy they spent in preparing new material for the lectures and laboratory. Here, the important work done over the last year to implement more content on the online platform Moodle has to be recognized as an important step.

The panel of experts concludes that generally speaking there are sufficient and effective measures for internal quality assurance which are also applied in the study programme “Electromechanics”. Although there is a good feedback mechanism from the students, there seems to be a lack of a regular communication and feedback mechanism with external stakeholders. The panel of experts therefore recommends that the faculty should establish an institutionalised cooperation with the employers (e.g. a committee) and with the alumni (e. g. an alumni association) (**Finding 8**).

8. Recommendations of the panel of experts

The panel of experts recommends to accredit the Bachelor programme “**Electromechanics**” offered by **the Technical University of Moldova** in Chisinau, Republic of Moldova, with conditions.

Findings:

1. The transparency of the documents needs to be improved, specifically the main focus of the programme and the awarded title should be expressed in a clearer way, e.g. in the Diploma Supplement.
2. The university should strengthen its efforts in attracting qualified students in order to maintain the high level of quality even with the demographic changes. The possibility of individual specialisation might be a good argument for students to decide for the programme.
3. The university needs the autonomy to increase the number of incoming students in order to offer specialities with real elective courses. The university should discuss this point with the Ministry and also try to get more funding from the industry.
4. Learning outcomes should be described in the course outlines.
5. The academic skills should be improved, especially the literature research skills and self-learning capacities.
6. Research literature should be more easily accessible, i.e. the amount of literature should be extended and research literature should be up to date.
7. The faculty should increase the number of courses in English language; especially courses in technical English are recommendable. In addition, English literature should be used in courses. Collaboration with other universities could be helpful to broaden the access to English literature.
8. The faculty should establish an institutionalised cooperation with the employers (e.g. a committee) and with the alumni (e. g. an alumni association).
9. More practical skills should be developed, e.g. by extending the internships and/or laboratories especially in the field of automatisation.