

Accreditation Report

Accreditation at the

Karaganda Technical University

Karaganda, Kazakhstan

„Production of Building Materials, Products and Structures” (Bachelor of Engineering and Technology / Master of Engineering and Technology / Master of Engineering), “Digital Technologies in Mechanical Engineering” (Bachelor of Engineering and Technology), “Digital Aerial Photography” (Bachelor of Engineering and Technology), “Mine Surveying” (Bachelor of Engineering and Technology), “Embedded Digital Control System” (Bachelor of Engineering and Technology)

I Procedure

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Attendance by ACQUIN office: Dr. Lyazzat Nugumanova

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The **Assessment Report** of the peer-review experts is **based on** the self-assessment report of the Higher Education Institution (HEI) and extensive discussions with the HEI management, deans and/or heads of the departments, heads of study programmes, lecturers, staff representatives, students, and alumni.

The basis of the **Assessment Criteria** is part 1 of the “Standards and Guidelines for Quality Assurance in the European Higher Education Area” (ESG) in the current official version. At the same time the national context, particularly the national regulations regarding the establishment of study programmes, are taken into account.

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II Introduction

The experts would like to thank the representatives of the HEI as well as students that they have taken part in the discussions and willingly shared information and their views during the site visit. The discussions are valuable not only for the assessment of the institution, but also for a better understanding of the legal and sociocultural context of the local higher education system.

Evaluation basis for the peer-review experts is the self-assessment report of the HEI as well as intensive discussions during the site visit with the HEI management, deans and/or heads of the departments, heads of the study programmes, study programmes coordinators, teachers, lecturers, administrative staff, students, and graduates.

Main objective of the accreditation procedure is to assess the quality of the study programmes and compliance with the "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (ESG). The ESG standards are applied as main assessment criteria in the international accreditation procedure. In addition, the respective country-specific criteria and standards are taken into account.

A group of experts was set up, which ensured that all areas relevant to the accreditation procedure (e.g. legal, structural, social etc. aspects) as well as the ESG and national criteria were considered. The peer-review experts include professors, representatives of the professional practice and the student representative. A certificate with the ACQUIN seal is awarded upon accreditation of the study programmes.

1 Short profile of HEI

The creation of the Karaganda Mining Institute in 1953 was prompted by the lack of specialists in the rapidly expanding field of mining and metallurgy in the Soviet Union. The aim of the institute was to train engineers for the mining industry. First 200 students were admitted in the winter semester of the founding year. The teaching staff consisted of 30 teachers. In 1958, the Karaganda Mining Institute was renamed into Karaganda Polytechnic Institute. In 1996, the institute was renamed into "Technical University" and is currently a regional center of higher technical and postgraduate education, science and engineering.

The university currently employs 603 full-time lecturers including 60 doctors of science, 46 professors of the Higher Attestation Commission, 218 candidates of sciences, 109 associate professors of the Higher Attestation Commission, 26 PhDs and 278 Master's degree holders as well as 53 additional employees.

The university has more than 12,000 students (including undergraduate and graduate students). It offers bachelor's, Master's, and doctorate degrees in eight faculties. The eight faculties are: Architecture and Construction, Mining, Mechanical Engineering and Transport and Road, Engineering Economics and Management, Innovative Technologies, Power Engineering, Automatics and Telecommunications and Correspondence and Distance Learning.

2 General information on the study programmes

The study programmes "Production of building materials, products and structures" (Bachelor of Engineering and Technology /Master of Engineering and Technology) are offered by the faculty Architecture and Construction, department of Building Materials and Technologies. Standard duration of study of the bachelor's degree is 8 semesters (240 ECTS credits), in master's degree in scientific-pedagogical direction 4 semesters (120 ECTS credits) and in profile direction 3 or 2 semesters (90 or 60 ECTS credits). The study programmes are offered since 2012.

The bachelor's study programme "Digital technologies in mechanical engineering" (Bachelor of Engineering and Technology) is offered since 2019. The regular period of study is 8 semesters (240 ECTS credits). The programme is offered by the faculty Mechanical Engineering, department of Technological Equipment, Mechanical Engineering and Standardization.

The bachelor's programmes "Mine Surveying" (Bachelor of Engineering and Technology) and "Digital aerial photography" (Bachelor of Engineering and Technology) are offered by the faculty of Mining, department of Mine Surveying and Geodesy. The four-year undergraduate programmes involve eight semesters of study with a total of 240 ECTS credits. The study programmes are offered since 2019.

The newly introduced bachelor's degree programme "Embedded Digital Control Systems" (Bachelor of Engineering and Technology) is offered by the faculty Power Engineering, Automation and Telecommunications, department of Automation of Production Processes. The regular period of study is 8 semesters (240 ECTS credits).

III Implementation and assessment of the criteria

The peer-review experts assess the quality of the study programmes and compliance with the ESG standards as well as with the national standards. The report documents the assessment of each study programme in the cluster, taking into account each criterion. Depending on the criterion, the assessment of criterion may be appropriate at the study programmes cluster level in order to avoid repetition and better describe general context.

1 ESG Standard 1.1: Policy for quality assurance

Institutions should have a policy for quality assurance that is made public and forms part of their strategic management. Internal stakeholders should develop and implement this policy through appropriate structures and processes, while involving external stakeholders.

1.1 Implementation

Karaganda Technical University (KTU) is a dynamically developing multidisciplinary, educational and scientific complex, a well-known educational center in the Republic of Kazakhstan (RK) and abroad that provides training of qualified personnel. The activities of KTU are closely related to the economic, social and cultural life of the country and the region as well as on the implementation of its Strategic Development Plan for 2014-2023.

The university has a Policy for Quality Assurance (hereinafter referred to as Policy) which is publicly available on the website of the university. Heads of all the departments of KTU bring the Policy to the attention of stakeholders through information tools, explanations at all the levels and are responsible for planning, implementing and quality improving within the framework of their functional responsibilities.

Students are represented in numerous committees and are thus able to participate in the development and implementation of the policy. External stakeholder such as employers are as well represented in different structural institutions of the KTU and actively involved not only in the quality assurance, but also in the development of study programmes.

The Policy supports such values as respect for academic honesty and freedom, non-protectionism, corruption, and discrimination. These values are reflected in the documents: University Charter, Internal Regulations, Code of Honor for Students, Undergraduates and Doctoral Students and the Code of Academic Integrity of the teaching staff and employees, the procedure for checking students' graduation papers for plagiarism.

Anti-corruption principles at the University are an important element of the quality assurance policy.

The quality management system of KTU strives to achieve international standards ISO 9001:2015.

The Department of Strategic Development with its sub-department Quality Management and Accreditation Center ensures the implementation of the policy and proper functioning of the quality management system at the university.

1.2 Assessment

For the processes of quality assurance of educational services provided, development and improvement of programmes in the HEI, the procedures are formalised in the form of Policy for Quality Assurance, University Charter, Internal Regulations, Code of Honour of students, Code of Academic Integrity of teaching staff and employees and others. The documents are freely available on the university website. The quality policy is promoted to all stakeholders by using various kinds of information spreading tools. The Policy emphasizes following areas such as academic honesty and freedom, non-protectionism, corruption and discrimination.

The university has a Department of Strategic Development, which is responsible for the implementation and proper functioning of quality management and accreditation. Relevant structural units such as departments, centers, services, faculties are responsible for further implementation of quality policy on different structural levels. External stakeholders are involved in the development of policy through various structures of the university.

All stakeholders participate in quality assurance processes and are responsible, within their competence, for the quality of the educational services provided.

1.3 Conclusion

The criterion is **fulfilled**.

2 ESG Standard 1.2: Design and approval of programmes

Institutions should have processes for the design and approval of their programmes. The programmes should be designed so that they meet the objectives set for them, including the intended learning outcomes. The qualification resulting from a programme should be clearly specified and communicated, and refer to the correct level of the national qualifications framework for higher education and, consequently, to the Framework for Qualifications of the European Higher Education Area.

2.1 Implementation

General overview

The content and structure of study programmes are formed in accordance with the requirements of the State Compulsory Standard of Higher and Postgraduate Education approved by

the Minister of Education and Science of the Republic of Kazakhstan (RK) order dated October 31, 2018 No. 604, the Rules of organizing the educational process on credit technology of education approved by the Minister of Education and Science of the RK order dated 20.04.2011 No. 152 and Model rules for the activities of educational organizations of the corresponding types approved by the Minister of Education and Science of the RK order dated October 30, 2018 No. 595.

Employers from among the heads of practice bases, representatives of enterprises including those of Corporate University, are involved in the development of the study programmes. Round tables with representatives of the professional practice are regularly organized to discuss different aspects of study programmes.

The developed modularized study programmes are annually discussed first at the meeting of the department, then at the meeting of the Quality Assurance Committee (QAC) of the faculty, and finally approved by the Academic Council of the university, which includes deans and heads of departments, bachelor, master and doctoral students, Chairman of the Association of Student and Youth Organization Zhas Orda, etc.

The internal evaluation of study programmes is performed by experienced and highly qualified faculty staff, heads of structural divisions of the university, and is considered at the meetings of the university.

The qualifications obtained upon completion of the study programmes are determined by the State Educational Standard of the corresponding level of education. In accordance with the National Qualification Framework (NQF), the qualification levels are related to the level of education and are described in the card of professional qualifications of the SQF.

The bachelor's degree programmes being accredited have a standard duration of study of 8 semesters (240 ECTS credits). The duration and number of credits is given by the Ministry of Education and Science. All undergraduate students due to the regulations of the Ministry need to take general education disciplines such as modern history of Kazakhstan, philosophy, foreign language, Kazakh (Russian) language, information and communication technologies, socio-political knowledge (sociology, political science, cultural studies, psychology), physical education etc. Students are required to engage in mandatory internships. This gives students the opportunity to gain first-hand practical experience in a professional environment. Students are awarded 12 ECTS credits for writing and defending thesis (project) or preparing and taking a comprehensive exam.

"Production of Building Materials, Products and Structures" (Bachelor of Engineering and Technology)

The main objective of the programme is to train specialists for the development of technology and organization of production of building materials, products and structures.

Graduates should be able to make calculations when designing / organizing production processes, to organize the production process by understanding the physical processes, to develop design documentation for the design of technical objects, calculate strength, stability, reliability of the structure during design and operation, to form the given structure and properties of building materials, taking into account external factors, to use technical regulatory documentation for the production of building materials, products and structures, to carry out quality control of building materials, products and structures, to manage the technological process of production of building materials, products and structures and to design enterprises for the production of building materials, products and structures.

The possible areas of professional activity of the graduates is production of building materials and structures, design of technological lines for the production of building materials and structures, construction, certification, quality control of building materials and structures, teaching in colleges of the corresponding profile.

Graduates can work in enterprises for production of building materials, reinforced concrete and metal structures; construction companies; research and design organizations, organizations for certification and quality control of building materials and structures; educational institutions of secondary vocational education.

The curriculum of bachelor's degree programme consists general education disciplines (mandatory and university component in total 56 ECTS credits), basic disciplines (university and elective component in total 112 ECTS credits) and major disciplines (university and elective component in total 60 ECTS credits). The list of disciplines of the mandatory and university component is determined by the State Compulsory Education Standard, and elective components consider specifics of the specialty and the needs of the labor market.

Practical training counts for 20 ECTS credits in the programme.

"Production of Building Materials, Products and Structures" (Master of Engineering and Technology / Master of Engineering)

The main aim of the study programme is to train specialists for the development of modern technologies in the production of building materials, products and structures and implementation of pedagogical activities in the field of preparing the production of building materials, products and structures.

Graduates should be able to carry out educational activities in professional educational institutions on the basis of psychological and pedagogical principles, to carry out research work within the framework of professional activities, to head the development and implementation of creative ideas in professional activities, to carry out intercultural communication in production and scientific and pedagogical activities, to carry out complex research, including interdisciplinary, based on a holistic systemic scientific worldview using knowledge in the field of history and philosophy of science, to carry out research in the field of production of building materials, products and structures, to develop technical and regulatory documentation for the production of building materials, products and structures, to carry out the development and implementation of progressive, economically sound technologies for the production of building materials, products and structures and to develop technologies for obtaining building materials and products using production waste.

Graduates can be employed in the following areas production of building materials, products and structures, ensuring stability of technological parameters, control of the technological process; design of enterprises for the production of building materials and structures; experimental re-search and computational experimental work to optimize the technological parameters of production, the introduction of new technologies and types of products; teaching in higher educational institutions, colleges of the corresponding profile.

The master's degree is offered in two directions: scientific and pedagogical and profile directions. Duration of study of scientific and pedagogical master's is 2 years (120 ECTS credits). Duration of the profile master's is 1 (60 ECTS credits) and 1, 5 years (90 ECTS credits).

The curriculum of both directions consists of cycles of basic and major disciplines. Both cycles offers disciplines of the university component and the elective component. The university component of the basic disciplines cycle of all educational masters' programs is determined by the State Compulsory Education Standard. The list of disciplines of the university component and the elective component is determined by the university independently which takes into account the needs of the labour market, expectations of the employers, the needs and interests of master students.

Students of the scientific and pedagogical master are awarded 24 ECTS credits for research work including an internship and a final thesis and 12 ECTS credits for a thesis defence. Students of profile direction (1.5 years) conduct a research work and implement a final project which is worth 18 ECTS credits and receive 12 ECTS credits for defence of the project. Students of the profile direction with one year duration are awarded 13 ECTS credits for a research work and project implementation and 12 ECTS credits for a project defence.

"Digital Technologies in Mechanical Engineering" (Bachelor of Engineering and Technology)

The main aim of the study programme is to train specialists for organization and modernization of machine-building production using innovative digital technologies in the field of design, preparation of production, production and provision of support for the product life cycle.

Graduates should be able to make calculations when designing / organizing production processes, to organize the production process by understanding the physical processes, to develop design documentation for the design of technical objects, to use international technical regulatory documents to ensure competitive production of engineering products, to design and calculate machine structures, ensure their production using modern CAD / CAM / CAE systems, to implement the "end-to-end design" technology, development and provision of support for the full life cycle by the implementation of product lifecycle management (PLM) and product management (PDM) technology, to develop a technology for the manufacture of machine parts in a "flexible production" using machine tools and CNC complexes, to ensure the operation of industrial robots and robotic complexes of mechanical engineering production and to ensure the production of machine parts using additive technologies.

The bachelor's degree programme aims to provide a basic education in general education, natural sciences, socio-economic, engineering and technical subjects of mechanical engineering in order to train qualified specialists for employment in the mechanical engineering companies that are important for the region and, in doing so, places a stronger focus on digital technologies. An important qualification goal is the professional preparation of students for work in modern production companies using innovative digital technologies in the areas of project planning, production preparation and implementation as well as along the product life cycle. Furthermore, reverse engineering and additive technologies as well as work with modelling software and AI systems were mentioned. Both theoretical basics and practical skills in the operation and programming of digital devices are to be taught. In addition to subject-specific objectives, the study programme also pursues aspects of personal development of the students that enable them to work independently.

The bachelor's programme is designed for a standard duration of four years (8 semesters) in a direct study (full-time). It is divided into general education subjects with 48 ECTS credits, basic subjects (102 ECTS credits) and profile-building subjects (50 ECTS credits), which are combined in various modules. In the theoretical education in the form of courses, 200 ECTS credits can thus be acquired. Twenty ECTS credits are awarded to students for various practical parts i.e. internships, 12 ECTS credits for the preparation/defence of the final thesis (diploma thesis) or for the preparation and taking of a complex examination, as well as 8 ECTS credits for sports, so that students acquire a total of 240 ECTS credits in the eight semesters.

The degree programme is designed in such a way that five to six courses are can be taken per semester, each of which has a scope of three to six ECTS credits. This means that exactly 30 ECTS credits must be acquired in each semester.

In the first four semesters of the bachelor's programme, the basic education in natural sciences and engineering is supplemented by education in the national language (Kazakh/Russian) and a foreign language, in socio-political subjects and sport. This is followed by four semesters of specialized studies. In the second part of the programme, students acquire the necessary engineering, technical and professional-organisational skills for the subject area. In order to individualise the study programme, 38 elective subjects are included in the course of study from the 2nd to the 8th semester, whereby one subject must always be selected from two alternatively offered subjects. Thus, in addition to the 23 compulsory subjects (except for sports, internships and a final thesis), 19 electives must be taken.

The internships to be completed in the degree programme are integrated into the course of study after the second semester (basic internship), fourth and sixth semester (production internship 1 and 2) as well as in the eighth semester (pre-degree internship) before the completion of the final thesis and are each assessed with 5 ECTS credits. They serve as professional orientation and qualification as well as for deciding on the topic for the final thesis.

“Mine Surveying” (Bachelor of Engineering and Technology)

The main objective of the study programme is to train highly qualified specialists who carry out mine surveying and geodetic control over the correct and high-quality mining operations for the extraction of minerals including disciplines that allow implementing “Industry – 4.0” on the basis of Building Information Modelling (BIM)- technologies.

Students upon graduation should be able to develop the planned-high-altitude mine surveying and geodetic support network at the industrial site and in underground mine workings, to conduct mine surveying surveys of mine workings, to develop digital plans and models of rock mass and workings, surface and underground structures, mineral storage facilities, rock dumps, to monitor the development plans of mining operations, the parameters of mine workings, the compliance of the geometric parameters of the complex and the construction of a mining enterprise, to determine the patterns of spatial distribution of structural and qualitative indicators of the field, as well as the characteristics of natural and man-made processes and to conduct surveying records of the movement of reserves, losses and depletion of minerals.

The areas of professional activity of the graduates are mining enterprises in the development of mineral deposits: coal, ore, alluvial, oil and gas enterprises, in the construction of industrial facilities, tunnels, subways. The objects of professional activity are mines, quarries, mines, tailings, industrial and construction sites, design and research institutes.

Similar to other bachelor programmes the curriculum is structured into general disciplines (56 ECTS credits), basic disciplines (112 ECTS credits) and specialty disciplines (60 ECTS credits). Core and university component are mandatory disciplines. Students can choose modules depending on their interest from an elective component.

“Digital Aerial Photography” (Bachelor of Engineering and Technology)

The main objective of the study programme is to train highly qualified specialists capable of performing a complex of works on decoding and processing video information, aerospace and ground images for developing and updating digital topographic maps and plans by photogrammetric methods.

By the end of their studies, students will be able to carry out aerial photo-geodetic support of cartographic images of individual territories and areas of the earth's surface, to develop state and special geodetic networks using satellite observation methods, to carry out aerial survey work and photogrammetric processing of images using geo-information programs, to develop and update digital maps and plans using stereo-photogrammetric methods of all scales, to develop design and estimate documentation for the production of cartographic and geodetic works and to solve various engineering and practical problems in the field of geodesy and cartography.

The areas of professional activity of the graduates include mines, quarries, mines, tailings, industrial and construction sites, design and research institutes. The objects of professional activity are aerospace enterprises, cadastral and land management centers, urban planning enterprises, cartographic and geodetic enterprises, departments of urban and agricultural management.

Similar to other bachelor programmes the curriculum is structured into general disciplines (56 ECTS credits), basic disciplines (112 ECTS credits) and specialty disciplines (60 ECTS credits). Core and university component are mandatory disciplines. Students can choose modules depending on their interest from an elective component.

“Embedded Digital Control Systems” (Bachelor of Engineering and Technology)

The main aim of the study programme is to train specialists for the adjustment, operation and modernization of embedded digital control systems for technical, mobile, autonomous and distributed systems.

Graduates should be able to make calculations when designing / organizing production processes, to organize the production process by understanding the physical and chemical processes, to analyse, plan and conduct business activities of business entities, to possess cognitive linguo-cultural complexes for solving professional problem, to carry out production and

technological functioning of embedded digital control systems (EDCS), to carry out design work to improve individual units and devices of the EDCS, - to provide service and operation of the EDCS, - to carry out research in the EDCS area and to apply modern software and hardware and information technology of EDCS.

The sphere of professional activity of the graduates are production, science, education and design organizations. Graduates are qualified to develop, implement and operate the embedded digital control systems for technical, mobile, autonomous and distributed systems in various fields of human activity.

Analogue to other study programmes the curriculum is structured into general disciplines (56 ECTS credits), basic disciplines (112 ECTS credits) and specialty disciplines (60 ECTS credits). Core and university component are mandatory disciplines. Students can choose modules depending on their interest from an elective component.

2.2 Assessment

General assessment

All study programmes have been developed in accordance with the current national requirements and standards of the RK. The study programmes are developed by the teaching staff of the graduating department. The university has a working group for the management of study programmes, which provides support in the development phase.

The programmes are updated annually and are discussed at the meeting of the relevant department, afterwards at the meeting of the faculty Quality Assurance Committee (QAC) and finally are approved by the Academic Council of the University.

Development and update of the study programme include on a mandatory basis discussion and coordination with the relevant industry and companies.

For the development and establishment of a new study programme, the university has a procedure for obtaining the necessary approvals in the university and from the Ministry of Education and Research.

The concept for a new study programme is submitted to and evaluated by a review commission at the HEI. After approval by the commission, the concept is submitted to the university's academic council. Approval by the Ministry is tied to certain student numbers. If there are no applicants for a study programme for more than three years, the programme is closed.

Due to requirements of the responsible ministry, the study programmes contain many modules that are not directly subject-related, which together with the subject-related modules reflect the four educational goals of the Council of Europe.

A student's individual study plan is formed for each academic year. Student can choose elective modules according to the trajectories. The choice of trajectories is made by subgroups of at least 8-10 learners. Individual learning pathways (outside the formed subgroups) are not envisaged.

The study programme documents include study programme plan, module handbook and individual syllabi. For peer-review experts it was challenging to understand the study programme plan and the module handbook. It would be beneficial for external stakeholders and for foreign students as well as to structure these documents more clearly and transparently. Especially, foreign students and teaching staff not familiar with the education system of the RK and individual university, will find it helpful when the information is presented more clearly. Therefore, the experts would recommend revising both of these documents for all study programmes. Moreover, the experts would recommend specifying the form and duration of the possible examination forms either in the study programme plan or in the module handbook. The university mentioned that this information is communicated to the students at the beginning of the semester, but experts would recommend including this information in public documents for interested applicants etc.

Conclusion

The criterion is **fulfilled**.

The peer-review experts make following recommendations:

- The module handbook as well as regular study programme plan should be structured more transparently and clearly.
- The form and duration of the examinations should be specified in the relevant study programme documents.

"Production of Building Materials, Products and Structures" (Bachelor of Engineering and Technology)

The bachelor's degree programme "Production of building materials, products and structures" is part of a diverse range of 76 degree programmes that are offered at the university. In a region with high raw material deposits, the programme is very meaningful in terms of content and virtually necessary.

The design of the study programme is based on feedback from the local industry. In a teaching innovation consortium with 70 members, companies and teachers coordinate the content and design of the study programmes.

The main objectives and learning outcomes of the bachelor's degree programme are:

- Acquire knowledge of the types of building materials and products

- Acquire knowledge of the types of production and production methods of building materials and products
- Competence to develop and optimise manufacturing and production processes for building materials and products
- Competence to manage the complete process chain from development and approval to marketing and sales of building materials and products.

Graduates of the programme can pursue the following professional activities: design and development, industrial and technological production engineering, organisation and management, experimental research and education.

In the opinion of the peer-review experts, the objectives and learning outcomes adequately reflect the requirements of the professional practice. The curriculum presented includes the modules necessary to achieve the objectives and the structure of the curriculum is suitable for this in the view of the experts.

Graduates of the study programme are adequately prepared to enter the labor market of the regional industry and take advantage of the career opportunities available in the companies.

The workload of the students is defined on the basis of 30h per credit and 900h/semester are set in the curriculum.

The compulsory internships are integrated into the curriculum and take place in the university's laboratories and in industry. Due to the close links between the university and industry, the university can support the students in the internship placement.

The recommendations of the previous accreditation have been implemented for the most part.

Due to the requirements of the Ministry, a significant number of non-subject-related modules (mainly soft skills and languages) are included in the curriculum. The corresponding modules are offered until the 4th semester. The recommendation to move these modules to the first two semesters could not be fully implemented.

The introduction of an elective course was implemented in principle. The expert group considers the existing offer of only two elective modules per semester to be expandable. More elective modules should be offered. The basic labelling of elective modules with the designation elective module in the curriculum would improve the structure and readability for students. Whether an elective module is offered could be linked to the number of participants. The university should make a better structure of elective modules and offer more elective modules.

The expert group sees an overall improvement in the assessed standards.

The further development of the study programme is to be regarded as positive. A need for optimisation is seen in the arrangement of the non-subject-specific modules in the curriculum and in the number of elective modules.

Conclusion

The criterion is **fulfilled**.

The peer-review experts make the following recommendation:

- The university should make a better structure of elective modules and offer more elective modules.

"Production of Building Materials, Products and Structures" (Master of Engineering and Technology)

The university offers the master's programmes with different durations of 1 year, 1.5 years and 2 years.

The programmes with a duration of 1 year and 1.5 years are designated as a practice-oriented master's programme for the employment of graduates in industry. A second master's programme with a duration of 2 years is more scientifically oriented and is intended to form the basis for the employment of graduates in research, teaching and educational areas.

Building on the bachelor's programme, the master's programmes "Production of building materials, products and structures" fit into the existing range of 76 programmes at the university. The separation into special master's programmes for industry and for young academics also results from the requirements of the Ministry. The university must strategically fulfil the Ministry's boundary conditions and thus the master's programmes fit into the university's overall strategy.

The design of the master's degree programmes takes place through feedback with the requirements of local industry. In a teaching innovation consortium with 70 members, companies and lecturers agree on the content and design of the study programmes. In addition, the university's strategic guidelines for research activities and the establishment of an education management system are taken into account.

The main objectives and learning outcomes of the master's degree programmes "Production of building materials, products and structures" with a duration of 1 year and 1.5 years are:

- Acquire knowledge of national and international standards and codes of building materials and products, and quality management standards.
- Acquire knowledge of production types and production methods of building materials and products

- Gain competence in problem presentation and problem solving
- Gain competence to lead staff, to organise teams and to distribute tasks
- Gain competence to develop curricula, to prepare technical documentation, to design manufacturing processes and to organise continuing education.

Graduates of the 1-year or 1.5-year master's programmes can take on management functions in industry.

In the opinion of the peer-review experts, the master's programme with a duration of 1 year and 1.5 years adequately reflects the objectives and learning outcomes as well as the requirements from the professional field. Though the master's programme with a duration of 1 year offers significantly fewer subject-specific modules. The university could consider if the ministerial requirements allow, revising the curriculum of the master's programme with a duration of 1 year.

The main objectives and learning outcomes of the master's programme "Production of building materials, products and structures" with a duration of 2 years are overall appropriate and reflect the master's level of education. The subject-specific knowledge and basic competences of the graduates of this master's programme are to be rated at the same level as the master's programme of 1 year and 1.5 years duration.

Additional goals are acquiring knowledge, methods and competences for research work and for teaching.

Graduates of the master's programme with a duration of 2 years can take on management functions in industry, can work in research and teaching and can start a Ph.D. study.

In the opinion of the experts, the master's programme of 2 years' duration adequately reflects the objectives and learning outcomes, as well as the requirements from the professional fields and the basis for teaching and research.

The curricula presented include the modules necessary to achieve the objectives and the respective structure of the curriculum is suitable for this in the view of the expert group.

Graduates of the master's programmes can work in regional industry, at universities, in education, in research institutions and abroad. In addition to the relevant career paths in industry, careers at universities and in the research sector are possible.

The workload of the students is defined on the basis of 30h per credit and 900h/semester are set in the curriculum.

The compulsory internships are integrated into the curriculum and take place in the university's laboratories and partly also in industry. The focus of the internships in the master's programme

is on pedagogical and research topics. Due to the close links between the university and an industry, the university can support the students in their choice.

In the view of the experts, the master's programmes reflect the four educational goals of the Council of Europe.

For the development and establishment of a new study programme, there is, as with the bachelor's programme, a procedure at the university for obtaining the necessary approvals at the university and from the Ministry of Education and Research.

The concept for a new study programme is submitted to and evaluated by a review committee at the university. After approval by the commission, the concept is submitted to the academic council of the higher education institution. The Ministry's approval is tied to a certain student numbers. If there are no applicants for a study programme for more than three years, the programme is closed.

The university has a working group for the management of study programmes, which provides support in the creation of study programmes.

The recommendations of the last accreditation were mostly implemented.

The introduction of an elective component has been principally implemented. The expert group sees the existing offer of only two elective modules per semester as expandable. More elective modules should be offered. The basic labelling of elective modules with the designation elective module in the curriculum would improve the structure and readability for students. Whether an elective module is offered depends on the number of participants. The university should make a better structure of elective modules and offer more elective modules.

The recommendation to integrate the English language more strongly in the scientific master's programme was implemented through a general foreign language module. Regarding the mobility of students and academic staff, an English teaching offer would be further suggested for the implementation of the international academic exchange.

Overall, the expert group sees an improvement in the evaluated standards.

The further development of the master's degree programme is positive. A need for optimisation is seen in the number of elective modules.

Conclusion

The criterion is **fulfilled**.

The peer-review experts make the following recommendation:

- The university should make a better structure of elective modules and offer more elective modules.

"Digital Technologies in Mechanical Engineering" (Bachelor of Engineering and Technology)

The objectives for the bachelor's degree programme "Digital Technologies in Mechanical Engineering" are clearly defined and make sense for the educational needs in the Karaganda region and in Kazakhstan as a whole as an industrial country rich in raw materials. The objectives take into account modern developments of the field. The goals pursued with the study programme are transparently presented in the documents. With regard to the intended qualification goals, the programme is structurally coherent. The courses are sensibly arranged in the course of the degree programme, starting with the general education subjects, through the basic subjects, to the profile-forming subjects. The subject-specific modules build on each other well throughout the course of study. The three internships that accompany the study programme are scheduled between the spring and autumn semesters, so that there is no full internship semester, which could also be used as a mobility window. The final semester is structured in a balanced way with three electives, the pre-degree internship and the writing of the final thesis.

According to the documents provided by the university, such as the programme description, curriculum and module handbook, the structure of the bachelor's programme "Digital Technologies in Mechanical Engineering" is suitable for achieving the intended qualification goals. The qualification objectives of the individual modules specified in the module handbook contribute to the overall qualification of the students in accordance with the objectives of the degree programme. However, the module handbook partly deviates from the current study plan, which should be checked. The module content conveys the subject-specific and methodological competences required for the bachelor's degree. The elective subjects allow students to organize their studies individually, although some of the alternative elective subjects offered are very similar in content. The necessity of and differences between certain electives (e.g. engineering graphics or descriptive geometry in the 2nd semester or cutting theory and cutting tools or cutting and cutting tools in the 6th semester) are not completely clear to the experts, especially since according to the students, they all chose engineering graphics because it was more meaningful for the study objective. Selection criteria for the electives are not mentioned, although the faculty staff are available for advice and support. An adjustment of the elective options, which are very extensive with 38 elective modules, would be desirable, as would a grouping of elective subjects into corresponding specializations, in order to make the selection of subjects coherent for the students. In addition, the information on the examinations should be specified in the module handbook with regard to type, scope and duration in order to make the examination requirements more transparent to the students.

The student workload is very balanced with five to six courses in the first seven semesters and evenly distributed with 30 ECTS credits each. The attendance and self-study times are appropriate and the allocation of ECTS credits according to the student's workload is considered plausible. Since the degree programme has only been installed at KTU two years ago, no statement can be made on the studyability with regard to the graduation rate. Despite high demand for the degree programme, no new students could be enrolled in the second year due to low numbers of high school graduates, which is why the promotion of the degree programme should be intensified.

The teaching forms essentially comprise lectures, exercises/laboratory work, projects and non-university internships. The type of teaching forms and their distribution in the curriculum correspond to the requirements of the educational goals. In particular, the various practical phases contribute to orientation and preparation for the professional requirements of graduates.

The connection between the university and professional fields of activity as well as the relevant companies is close. This is demonstrated by the involvement of companies in the design of the degree programme and by the involvement of lecturers from industry. As a result, labour market requirements were taken into account in the further development and design of the degree programme.

The concept of the degree programme is largely coherent and suitable for achieving the defined degree programme objectives. From the point of view of both content and didactic pedagogy, the degree programme fundamentally reflects the qualification goals. The modules contained therein build on each other well and provide graduates with basic professional qualifications. The studyability is given with regard to the planned workload. Student satisfaction is high and the prospects of finding a job after graduation can be rated as very good.

The new degree programme "Digital Technologies in Mechanical Engineering" developed by KTU covers the technical disciplines that are necessary for the qualification of students in the targeted professional fields of industry.

Conclusion

The criterion is **fulfilled**.

“Mine Surveying” (Bachelor of Engineering and Technology)

The newly developed study programme fits well into the mission and overall strategy of the university.

The graduates of the study programme acquire broad competencies and skills which should enable them to find an appropriate position after graduation. The defined objectives are clear and appropriate. Similar to other study programmes, industry partners are intensively involved

in the introduction and development of the degree programme. Due to close industry connections of the university and faculty staff, students are able to find internship placements.

The content of the programme fully contributes to meeting the defined objectives. The curriculum reflects the modern developments in the field.

The ECTS credits are evenly distributed throughout the semesters. Students need to take internships outside of the university. Due to the broad network of partners that the university and faculty staff have, the students are provided necessary assistance in finding an internship position. Overall, the experts consider the workload of students in this study programme as appropriate.

Conclusion

The criterion is **fulfilled**.

“Digital Aerial Photography” (Bachelor of Engineering and Technology)

The bachelor’s study programme is newly developed. The programme is designed to be completed in eight semesters. The study programme has clear and defined objectives which correspond to the requirements of the local and international labour market. Students acquire not only subject-specific competencies, but also methodological skills and through various general disciplines and other university offers they are able to develop their personal and soft skills. The disciplines taught in the bachelor’s programme contribute to the meeting of the defined objectives.

The study programme is taught in Russian and in Kazakh languages. The current English title of the study programme is “Digital Aerial Photography”. The term photography is not the most appropriate term in this case, considering that photography refers more to the image production in the area of arts. The university should consider renaming the study programme into “Digital Aerial Photogrammetry”.

Conclusion

The criterion is **fulfilled**.

The peer-review experts make the following recommendation:

- The university should consider renaming the study programme into “Digital Aerial Photogrammetry”.

“Embedded Digital Control Systems” (Bachelor of Engineering and Technology)

The study programme curriculum is largely regulated by the national standards of RK and regulations of the Ministry of Education and Science of RK (MES RK).

Generally, the programme objectives and learning outcomes are clear and well-defined. The structure of the curriculum and the modules offered allow to fully meet the defined objectives. Experts are convinced that the study programme will be regularly updated based on the innovations in science and in industry.

Bachelor's degree consists strictly of 240 ECTS credits which is regulated by the standards of the MES RK). The study programme relevant documents presented by the HEI (Modular educational programme, approved by the Academic Council) describe possible learning trajectories, however, visually these learning trajectories are not easily understandable.

The study programme includes obligatory internships in the amount of 10 ECTS credits of industrial practice and 12 ECTS credits of pre-diploma practice. The university has agreements with the relevant companies on practical training of students at these enterprises, for example, with TOO "KazPromAvtomatika".

The annual update of the programme allows to respond to the main trends in the development of management systems, and the coordination with leading companies in the field of digital management systems and allows it to meet the requirements of employers in the region. Expert group would like to stress that the university has established formalized process for involving relevant employers in the development and update of the study programmes. A wide range of industry representatives are involved which allows a varied input.

Experts note that relevant study programme documents are difficult to understand. Here the university could think about ways to present the information more clearly.

2.3 Conclusion

The criterion is **fulfilled**.

3 ESG Standard 1.3: Student-centred learning, teaching, and assessment

Institutions should ensure that the programmes are delivered in a way that encourages students to take an active role in creating the learning process, and that the assessment of students reflects this approach

3.1 Implementation

The student-centered approach of learning and assessment is ensured at the university through multiple ways such as possibility of selecting the elective disciplines, organizing professional orientation of the student in the process of admission and training, consulting students by the advisor service and the staff of the registrar's office, recognizing disciplines passed at the preliminary levels of education and at other universities (in the case of transfer, academic mobility).

Students can organize his or her own individual curriculum, take part in the academic mobility including via distance learning technologies, participate in double-degree programmes and complete additional training in the summer term.

Each student forms his or her individual study plan from the core and elective disciplines of the working curriculum of the study programme. The student selects elective disciplines. The list of elective disciplines with indication of pre- and post-requisites determines the educational trajectory of the student. The student's individual plan is formed for the academic year (for terms) with the help of an adviser, a faculty member of the graduating department who has working experience and is an expert in the structure of the educational process in the student's specialty. The main task of the adviser is to assist the student in selecting the learning path. The plan is approved by the dean of the faculty, signed by the adviser and the student.

The individual study plan of a master student is compiled under the guidance of a scientific adviser who has at least a doctorate degree, a candidate of science or the academic title of professor, associate professor and who is actively involved in research work in this branch of science.

Students are encouraged to work independently, which is aimed at developing self-education skills within the framework of the chosen educational trajectory. The student independent work contains such elements as preparing for classes, independent studying of individual topics of the program, preparing for exams and a variable part, which provides for the implementing of various tasks. The types of students' independent, workload in hours, the form and timing of examination are regulated in the working curricula of the study programme and are concretized in the corresponding sections of the syllabus. The main forms of student independent work organization are: repetition of the acquired lecture material, independent mastering of new information, study of additional literature to form the conceptual apparatus; work with sources; work with training programs; preparation for practical, laboratory and seminars; solving problems; drawing up diagrams, diagrams; research, analysis and generation of various reports.

The teaching staff of the university introduces modern pedagogical technologies and new teaching methods. These methods include application of industrial and business situations, case studies, the use of problematic and multimedia lectures, the use of teamwork methods, the application of the results of students' scientific activities in the educational process, group and individual projects, round tables, press conferences and research projects.

Current monitoring of progress, intermediate and final attestation is carried out in order to determine the degree of mastering by students of vocational training programs and the State Compulsory Standard of Higher Education. Monitoring the current progress involves assessing the progress of students in the framework of seminars, classroom consultations, self-training

and control activities. The analysis of the current progress of students is carried out using a rating system.

An important element in the assessment of students' knowledge is a midterm exam, which takes place in the 7th and 14th weeks of the semester. The results of the midterm exams are discussed at the meeting of the faculty council and rector's meetings.

The duration of examinations and the number of exams are determined in accordance with the academic calendar and the approved working curriculum of the study programme. Responsibility for organizing and conducting the exam lies with the deans and the registrar's office.

Final attestation of students is the final procedure carried out to determine the degree of mastering the volume of academic disciplines provided for by the state compulsory education standard. Final attestation is carried out in the form of defending graduate work or passing a comprehensive exam for a certain category of students. The university has implemented procedures of checking students' papers on plagiarism.

3.2 Assessment

The study programmes are offered as full-time and part-time. Learning process is organised in the system "Univer". The system provides students with access to the necessary educational and methodological documents and literature.

Univer system provides weekly scores of students for completed types of work. It automatically generates a summary score for students' grades and calculates the individual grade for the discipline after entering the examination score.

Even before the Corona pandemic, there were efforts at KTU to conduct teaching in the digital environment. Since the initial lockdowns in Kazakhstan, this digital strategy has been further extended to enable students to receive location-independent support in their respective stages of study. As a result of the far-reaching Corona measures, the implementation of this strategy (as at many other European universities) has been advanced and implemented even faster overall. For example, since the beginning of 2020, students have been able to continue their studies digitally as far as possible, so that time lost due to missing face-to-face courses is minimized. This also includes the various forms of examinations, which in this context were primarily conducted in an equivalent online format by means of proctoring. In this way, students were able to keep to their standard semesters or complete their studies in the regular study duration. Since implementation, the entire conversion process has additionally been analysed and monitored by a specially established commission. The digitization processes defined here are thus regularly discussed and potential improvements addressed in the control loop in order to achieve continuous improvement.

A central goal of the university is to promote students and companies from within the university environment. In this way, scientifically relevant findings can be put into practice more quickly and students are given the opportunity to better specialize in the company. At the same time, the students are supported in their social participation between the company and the university, and later (as alumni) they are again part of the scientific development in practice.

During the interviews with the faculty, it became clear that the abilities needed in practice in the later occupation are taught intensively in the university. This was also verified by the representatives of the students, who confirmed that they adjust well to the professional life after their studies. In addition, there is a great demand for students who can specialize further during their university education and thus take on special tasks in management positions in the participating companies.

According to statements of the university, 100% of the students who have started the final examination, also pass at the latest in the second attempt. About 5-6 students (of the faculty) drop out of the study programme for personal reasons without registering for the final examination beforehand. From the expert group perspective, this is an above average rate.

Representatives of professional practice teach certain courses, which ensures the seamless link between the theory taught at the university on the one hand and the practice in the company on the other.

The university uses mainly written and oral exams as main methods of assessing the knowledge of students. Mid-term exams are more varied. Assessment methods are communicated to the students and are published in the relevant study programme documents including the syllabus. The university has implemented a procedure to check for plagiarism. Teaching staff is supported by the university to regularly acquire new teaching methods.

In case a student disagrees with the exam grade, the HEI has implemented an Appeal Commission and a formalised an appeal procedure for the student. Based on the results of the appeal, the grade for the exam may be changed.

The procedures for re-taking exams in case of failure or re-study of an unaccomplished discipline do not seem quite clear and transparent. Expert group considers that it would be desirable to spell out these procedures more detailed and comprehensibly.

Generally, the expert group based on the self-assessment report as well as on the interviews conducted is convinced that the university enables and encourages to use different methods of teaching and learning. The university quickly adjusted to the new environment due to the Corona pandemic and enabled further smooth education of the students. Overall, taking into consideration the requirements of the Ministry of Education and Science of the RK and country-context, KTU enables students to take an active role in creating the learning process.

3.3 Conclusion

The criterion is **fulfilled**.

4 ESG Standard 1.4: Student admission, progression, recognition, and certification

Institutions should consistently apply pre-defined and published regulations covering all phases of the student “life cycle”, e.g. student admission, progression, recognition and certification.

4.1 Implementation

The admission of students to the university is performed on the basis of the Standard rules for admission to training at education organizations implementing educational programs of higher education dated October 31, 2018 No. 600. The regulations are provided by the Ministry of Education and Science of RK.

An admissions committee is formed to organize the admissions process including receiving the admission applications and forming the contingent of students. All normative legal acts on admission of applicants are posted at the university website and information stands of the admissions committee.

The contingent of students is formed of the number of applicants with a basic secondary education, technical and vocational or higher education. Admission to training in postgraduate education programmes is performed in accordance with the Standard rules for admission to training in educational institutions that implement vocational training programs of higher and postgraduate education based on the results of Comprehensive Testing and educational programs.

Applicants who apply for undergraduate studies need to take a Unified National Test which consists of mandatory subjects such as history of Kazakhstan, mathematics etc. and profile subjects which depend upon the study programme chosen. Applicants who apply for a graduate education need to take a unified test, which is coordinated and organised by the Ministry of Education and Science of the RK.

Depending on the points received in the test, students can get a state grant, which covers tuition fees and a monthly stipend.

The university collects information on students' progression, this includes results of exams, drop-out rates etc. This information is gathered in the system Univer and passed on to a relevant faculty.

The recognition process is regulated by the national regulations of the Republic of Kazakhstan. Generally, previous education can be recognized, and the process is defined at the university.

The university issues graduation certificates, transcript records and a diploma supplement.

4.2 Assessment

Admission of applicants to HEIs in Kazakhstan is based on the UNT (Unified National Test), while the grants for studies are awarded by the Ministry of Education and Science of the RK based on the points received for the test. Universities are not involved in the distribution of grants.

Admission to fee-based studies is based on the availability of places and the passing score of the UNT. These procedures are strictly regulated by the relevant Ministry.

Application procedures for bachelor's and master's programmes are similar, but the complexity of the respective preliminary examinations for the respective degree programme differs. These are set by the Ministry of Education and Research. Points are awarded in different subject areas, so that an initial assessment of the student's abilities is given. According to statements by the university, the respective capacities of the university are sufficient to ensure proper teaching even with higher numbers of applications.

Information on the learner's progress during the study process is presented in personal files stored in the Dean's Office and in the electronic logbook of the Univer system.

Upon graduation students receive national transcripts and diploma supplement. The transcript indicates all the modules studied by the student and the grades achieved.

The processes of admission, crediting, academic mobility of students, recognition and graduation are defined and regularly checked by external inspections.

4.3 Conclusion

The criterion is **fulfilled**.

5 ESG Standard 1.5: Teaching staff

Institutions should assure themselves of the competence of their teachers. They should apply fair and transparent processes for the recruitment and development of the staff

5.1 Implementation

The personnel policy is formed by the management of the university and is implemented by the personnel service. The personnel policy of KTU is reflected in the Charter of the organization, the mission of the organization, the collective agreement, the internal labor regulations, the employee's contract, the regulation on remuneration and in the regulation on the certification of personnel.

The teaching staff is formed on the basis of the needs for the effective implementation of the study programmes, taking into consideration the total amount of the teaching load per fulltime teacher and the contingent of students.

The process of recruiting, determining the adequacy of the qualifications of employees, recruitment, separation, preparing documents for approval in positions of employees is managed by the Department of Administrative Development (DAR) together with the heads of structural divisions guided by the staffing table.

The rights and obligations, responsibilities and authorities of the teaching staff and the university employees are determined by job descriptions and regulations on structural divisions. Responsibilities are distributed depending on qualifications, work experience, personal characteristics and needs of the university.

The system of material incentives and social support for the teaching staff based on the results of differentiated remuneration has been developed and operates in accordance with the Regulations on the teaching staff rating of KTU.

Twice a year, a personal rating of each faculty member is made, which evaluates educational-methodological, research, educational and social work for the academic term. Based on the results, a consolidated report is drawn up, depending on the results of the ratings increasing coefficients to the official salary are established.

The teachers with less than five years of work experience are trained at the Center of Engineering Pedagogy of KTU, where they study innovative methods and technologies of teaching. The departments pay great attention to the use of information technology in the educational process. The modern development of computer and communication tools has led to the use of the information technology as a teaching tool that improves the teaching process and increases its efficiency and quality.

The Institute of Mentoring is successfully operating at the university to support young teachers. Young teachers who have started teaching for the first time are obliged to conduct an open class during the first year of work, the results are discussed at the meeting of the department and if necessary, recommendations are made. Monitoring open classes and master classes is carried out on an ongoing basis; for this purpose, a university-wide "Schedule of open classes and master classes" is drawn up at the beginning of each academic term. The quality is monitored by the Department of Academic Affairs.

5.2 Assessment

The university has appropriate processes and procedures for recruitment and development of staff, which contain the complete procedure from the approval of a position, the advertisement

of the position, the verification of the existing qualification and the suitability for the position, the recruitment itself, the eventual transfer and dismissal up to the integration of the evaluation processes. The processes and procedures developed are clearly defined and the recruitment procedure can be classified as transparent.

The university has created a separate central department, which is supplemented by the heads of the respective structural units in carrying out the processes.

Scientific activities of teaching staff are a prerequisite for working at the university and are supported by incentive systems. The research topics of the teaching staff are supported by the students in the master's programmes. Parts of the research topics are integrated into the corresponding thesis assignments.

Overall, there is an adequate support for the academic and scientific activities of the teaching staff.

The university supports the teaching staff in the acquisition of basic and new teaching methods and technologies. Special support is given to new and mostly young teachers, who are supported by the Institute for Mentoring in their first year of work. In addition to teaching the basics, the implementation and success of the teaching is monitored through so-called "open classes". Teachers with less than five years of teaching experience receive further training at the Centre for Engineering Pedagogy. Innovative teaching methods and teaching technologies are part of the training and further education, which is documented with corresponding certificates.

The support provided by the university for the further development and training of teaching staff can be assessed as adequate.

The personal assessment of teaching staff, which is carried out twice a year, and the associated reward and incentive systems motivate teaching staff to constantly examine their own quality.

The existing processes ensure in the long term that the teaching staff is suitable for the implementation of the study programme.

The extensive support measures for the career entry of teaching staff are to be rated positively.

The results of the assessment did not reveal any significant need for optimization. Due to the very strict requirements of the Ministry, the university is limited in its possibilities in this regard.

With regard to the teaching staff, the only recommendation during the initial accreditation was to strengthen the English language. During the accreditation review, younger colleagues reported that they also teach in English language, so it can be assumed that there has been an improvement here.

Overall, the university has continuously improved the standards to be assessed and optimised the procedures and processes regarding teaching staff.

5.3 Conclusion

The criterion is **fulfilled**.

6 ESG Standard 1.6: Learning resources and student support

Institutions should have appropriate funding for learning and teaching activities and ensure that adequate and readily accessible learning resources and student support are provided.

6.1 Implementation

The university has six educational buildings, a health center, a sports complex, 3 hostels, a large food complex "Polytechnic", a sports and health camp "Polytechnic" that is located in the tract of Karkaralinsk (200 km from the city), the Palace of students "Zhastar alemi", service and auxiliary premises (6 Centers of working professions, a carpentry shop, garages and others). All of them comply with sanitary and epidemiological standards and requirements. The material and technical base of the university provides for all types of laboratory and practical classes, research work of students, provided for by curricula, and meets the current sanitary and technical standards, as well as the requirements of the State Educational Standard of Education of specialties.

The university classroom stock includes 345 classrooms, among them 102 specialized laboratories, 186 general education classrooms, 57 computer classes. Classrooms and other educational and laboratory premises are equipped with appropriate furniture and necessary equipment.

Medical care for employees and students is provided by KTU health center with the total area of 174.2 m² equipped with physiotherapy rooms, treatment rooms, an isolation ward, a complex of modern medical equipment. In 2017 a medical office was opened in the first educational building with the area of 18 m².

The university has three student dormitories.

The university constantly informs and updates students on events and news of the university through different channels. On the website of the university, announcements, and results of all significant events with participation of students and teachers are posted. Consulting students on the educational process is performed by employees of the Department of Academic Affairs, the Registrar's Office, dean's offices and advisors. The basics of the educational process are described in the Guidebook. All normative and methodological materials, the timetable, the

Catalog of elective disciplines and other documents are duplicated on the university website in the "Student" tab Univer and on the information and educational portal.

KTU's financial resources are formed by state budget funds, state scholarships and tuition fees. The university receives additional funds from state-funded scientific projects and research projects with companies. This financial basis is used for the university's educational and scientific activities as well as for financing the equipment needed for these activities.

The university has six teaching buildings, a health centre, a sports complex, three dormitories, a large canteen for meals, a student palace for recreation and events, a sports and recreation complex 200 kilometres from the city, and service and support facilities. The teaching buildings contain 345 classrooms, 102 of which are special laboratories, 186 lecture and seminar rooms and 57 PC cabinets. The rooms have the necessary equipment for their use and are equipped with modern computer and projection technology as well as classic blackboards and white boards. These resources are used to carry out all teaching and research tasks of the university.

The laboratory equipment for the programme "Digital Technologies in Mechanical Engineering" includes various machine tools with modern CNC controls for turning, milling, drilling and grinding, two presses, several industrial robots, equipment for surface coating, storage technology for raw materials, various measuring devices and measuring technology as well as modern computer technology with CAD and CAE software. The teaching staff are regularly trained on record with regard to occupational health and safety and working in the laboratories.

The department responsible for the study programme "Embedded digital control systems" has developed its own material and technical base, represented by a number of laboratories: laboratory of innovative technologies, automation laboratories, training centre "KSTU - Mitsubishi Electric - Kazpromavtomatika", teaching and research complex of international remote access. It also has branches of the department in production (Kazpromavtomatika LLP), where it can use industrial equipment for the educational process and scientific research. The equipment is represented by both educational stands of technological equipment (diffuser, belt conveyor, fan, automatic processing and storage line, etc.) and specialized automation systems represented by the equipment of Festo and MITSUBI.

In the study programmes "Production of Building Materials, Products and Structures" for making and testing concrete, mortar, screed and testing cement the university has various equipment but most without connection to the computer. For testing steel and metal KTU has modern equipment with connection to the computer which provides many options for analysis.

The "laboratory equipment" for the programmes "Mine Surveying" and "Digital Aerial Photogrammetry" are the photogrammetric and geodetic instruments necessary for a sufficient measuring practice of the students, such as cameras, camera-drones, total stations, leveling

instruments, GNSS-receivers, laser scanners as well as calibration-instruments, –laboratories and –fields, with the appropriate processing software available to students in sufficient numbers in KTU computer labs. This “laboratory equipment” is partially available at the KTU. Through co-operations with partners e.g., from the mining industry, cadastral offices and so forth KTU is strongly integrated into the industrial center of Kazakhstan. Thus the university has further access to appropriate instruments as well as to experienced engineers who are able to explain the students (and the teaching staff) the functioning of the measurement instruments (if necessary) and how to use them the right way.

The laboratory rooms and specialized cabinets are used for the practical and interactive training of students in the various degree programmes. In addition, the equipment, and facilities of the leading companies in the region can be used when completing internships. Students are supported by the university's close relationships with national and international companies, research institutions and universities when looking for an internship place. Within the framework of co-operation agreements, students of higher semesters have access to laboratories of cooperating companies and research institutions.

An information system "UNIVER 2.0" has been introduced at the university to support teaching and learning processes. The university's internet pages have been redesigned and are updated daily.

The university has a central library with Russian, Kazakh and, to a limited extent, foreign - mainly English - literature. In addition, electronic media are available to students. The stock of literature is constantly being expanded and the requests of the staff are taken into account. In addition, specialist literature in scientific databases such as Clarivate Analytics, Springer Nature, Elsevier and others can be accessed via the library. All teaching materials can be made available on electronic data carriers, mainly in Russian or Kazakh. There are 290 seats available in the various reading rooms. In addition, the library has 157 computers for users and for automating library processes, 10 scanners, 1 A3 copier and 13 printers. There is an electronic library catalogue that meets international requirements and allows remote access to other libraries via a new interface.

The KTU has an extensive information technology equipment with 3186 PCs and 13 servers, over 300 WLAN access points and a powerful Internet with a transmission speed of 500 MBit/s, to which the teaching buildings and halls of residence are connected. A learning management system is installed to support studies.

In the language centre, language courses in English, Russian and Kazakh are offered to students, as well as in-depth courses for the translation of specialised texts with certification.

There are three halls of residence for students in the immediate vicinity of the university, whose allocation of places is subject to predefined guidelines.

Equal opportunities for students, especially for students with children, foreign students, students with health problems and students with disabilities are regulated by the higher education legislation of the RK. These requirements are strictly enforced at the university. In order to support students in case of problems (illness, birth of a child, important personal reasons, etc.) related to the educational process, the university has developed regulations. These students are given the opportunity to take a leave of absence, to complete an additional semester or to study according to an individual study plan. In addition, every student can contact the rector of the university with their personal concerns via the "Rector's Blog". All questions and problems addressed are published there and can be viewed by everyone.

A student advisor (curator) is assigned to each student group. He or she is the direct contact person for students throughout their studies and supports them in organizing their studies and helps solve housing or social problems.

The University Centre for International Cooperation and Academic Mobility assists domestic and foreign students in all matters concerning mobility. Moreover, the centre organizes partnerships with national and international institutions.

For students, there is a central service centre where government services (e.g. application, information, preparation of proofs and documents, etc.) can be applied for and provided with appropriate support.

A health center with various medical facilities and modern medical equipment on campus is available for the medical care of staff and students.

6.2 Assessment

According to the interviews conducted with the programme managers and students, as well as based on the self-documentation provided, it can be stated that the material resources for achieving the study programme objectives are available and are ensured for the entire period of accreditation. There are sufficient teaching rooms and specialized laboratories equipped with machines and computers as well as access to the Internet. The laboratory equipment should be constantly modernised with regard to the realisation of research projects; modern equipment is partly used through industrial cooperation. In addition, there are rooms for conducting courses and practical training in various industrial companies, which guarantees practical training directly on site in accordance with the requirements of the labour market.

Expert group would suggest the KTU to consider installing compression and bending testing machines with a direct connection to the computer, which is in this field currently state of the

art. This way more advanced research projects can be undertaken not only by the faculty, but also by graduate students.

Development of the material and technical base of the study programme is carried out on the basis of annual plans developed and approved by the management of the university, formed on the basis of applications of the heads of departments. The expert group would recommend to extend the planning horizon for the development of the material base to a longer period of time, considering that the bachelor's study programmes run for four years. The university should develop a long-term strategy concerning development of the resource base and acquisition of new equipment.

The library is extensively equipped and provides all necessary teaching materials required for studying. However, there is still a potential for improvement here, which the university has already recognized. Older literature held by the library will gradually be made available in a digital format, although this is currently happening very slowly. However, students also have the option of requesting missing books, which will be ordered by the library administration.

The information technology equipment can be rated as very good.

The university provides adequate support services in form of mobility support, counselling and advising. Each cohort gets a student advisor which is responsible for the various issues concerning the study process. Students can contact an advisor anytime and he or she is responsible for guiding students through their study period.

The official network of partner universities of KTU is mainly located in the Russian-speaking area. However, students also have access to other international partner universities with a technical orientation, such as the Technical University Berlin. According to the university management, modules taken at foreign universities are recognized and credited without any problems, so that students do not lose any time. This enables uninterrupted student mobility. For this purpose, the university in Karaganda has set up its own counselling centre for the individual support of students for national and international exchanges, which primarily provides support in planning and organization.

There are about 40 students with physical disabilities at KTU. The students are supported by the university-affiliated bodies. In addition, the university is mostly barrier-free and provides these students with suitable housing nearby so that studying with an impairment can run as smoothly as possible. The general conditions for students with disabilities are therefore ensured.

Overall, the facilities, equipment and support services at KTU are adequate for achieving the objectives of the individual degree programmes and are in line with standard practice in the

country. The organization of the educational process and the supervision of students at the KTU are well organized and transparent.

6.3 Conclusion

The criterion is **fulfilled**.

The peer-review experts make the following recommendation:

- The university should develop a long-term strategy concerning development of the resource base and acquisition of new equipment.

7 ESG Standard 1.7: Information management

Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes and other activities.

7.1 Implementation

The university has an information system of collecting and analysing full-fledged information of the quantitative (information of the contingent of students) and qualitative characteristics of students at all levels: bachelor's, master's, doctoral studies.

The information system includes the corporate computer network, its own domain name kstu.kz, the corporate information system of managing the educational process "Univer 2.0" (identification of problem areas that hinder the work of individual business processes and the educational process in general), the automated integrated library information system "Irbis" and the programmes "1C Personnel" and "1C Accounting". There are official groups within WhatsApp messenger for the operational interaction of structural units and departments of the university.

Responsibility for the functioning of information system and reliability of the processed information is assigned to the deans and heads of departments. Access to information is carried out in accordance with the multi-role policy: dean, deputy dean, student department, etc. Access to information is carried out only for an authorized user and is restricted depending on the needs of users and the functional responsibilities of the service personnel.

A registrar's office service analyzes and manages the academic progress of students.

The information analysis of academic, scientific, educational processes is carried out in the monitoring section of the information system "Univer 2.0", in the system "Rating Card", electronic forms in the Google Forms system. The analysis of the information received is presented to rector, supervising vice-rectors, deans, heads of departments and chairmen of councils.

7.2 Assessment

For the successful implementation of information systems management process, information management processes have been introduced at the university which also correspond to the goals and trends of the education system of RK. The university has information systems of data collection and analysis and data processing, which are focused on accessibility and use of educational resources.

In order to improve internal quality assurance system of teaching subjects the university uses information system "Kartu Rating", which provides transparency of interaction and communication with students and teaching staff. Monitoring of student satisfaction with study programmes is carried out periodically. The Student Services and Support Services effectively ensure that the information is accurate, complete and provided in time.

Job placement of graduates is monitored annually and job fairs for graduates are organised with the invitation of business and company managers. Vacancy databases are created to ensure the employment of graduates and the Career Centre. An important factor is the successful employment of graduates in their profile and positive feedback from employers.

Overall, the university has implemented formal procedures to collect and analyse the information on study programmes. The data collected includes among others main data on student body, graduates and satisfaction with study programmes. The information collected is analysed by the responsible personnel at the university in this case management of the university and individual faculties.

Students are involved through taking part in surveys. According to the interviewed students, they also get general feedback on the results of the surveys and implemented changes are communicated to the students.

7.3 Conclusion

The criterion is **fulfilled**.

8 ESG Standard 1.8: Public information

Institutions should publish information about their activities, including programmes, which is clear, accurate, objective, up-to date and readily accessible.

8.1 Implementation

The university has a wide range of information materials and communication channels. This includes, for example, brochures in printed and digital form and a website in several languages. The homepage is available in Kazakh, Russian and English. The website is clearly structured and up to date.

A central mean for sharing information is the university website. Each department has its own section on the KTU website and posts information of specialities, study programmes, qualifications awarded at the end of the studies, as well as the progress of degree programme implementations. Besides announcements regarding upcoming or passed events, information regarding the curricula, course descriptions, catalogues of elective disciplines as well as other relevant material is available. Study relevant documents and information are easily accessible, for example the study plan as well as the individual subjects with their description, contact persons and other documents concerning the organization of studies. Moreover, information regarding the quality control measures is published. This information is publicly available which enhances the level of transparency.

In addition to the website, the university interacts with the public through further channels of communication such as open days and promoting activities at secondary schools. Moreover, the university publishes 350 copies of its own newspaper called “For Polytechnic Knowledge”.

Every year the university forms a media plan for the calendar and academic year that reflects the publication schedule in various media (TV, press, Internet). The plan also indicates the place, size, time, number and intensity of publications, placement of thematic materials in several media. The university sends all press reports to different mass media: printed (newspapers, magazines, bulletins, almanacs); electronic (radio, television); Internet portals (Internet resources of news agencies, print and television media, websites, etc.). KTU publishes information about educational and research activities and events on popular social networks.

8.2 Assessment

The university provides timely, reliable, accurate and up-to-date information. The main channel of informing about the activities of the university is the website of the university. The website contains among others information on all study programmes, on cooperation with industry and scientific partners, teaching staff, professional achievements and current events. The website is available in three languages Kazakh, English and Russian. However, the information on the English version of the website is much more limited. Considering the internationalisation activities of the universities and goals it had set, the experts would encourage the university to expand the information provided on the English version of the website. Moreover, KTU could consider providing information on the information security of the website and proper protection of information.

In addition, KTU actively uses social networks such as YouTube, Facebook, Instagram to spread information on university and individual study programme activities.

8.3 Conclusion

The criterion is **fulfilled**.

9 ESG Standard 1.9: On-going monitoring and periodic review of programmes

Institutions should monitor and periodically review their programmes to ensure that they achieve the objectives set for them and respond to the needs of students and society. These reviews should lead to continuous improvement of the programme. Any action planned or taken as a result should be communicated to all those concerned.

9.1 Implementation

KTU regularly monitors and reviews its study programmes, which is part of the university's quality assurance. The monitoring and review consider external and internal environment, resources, labour market and educational services.

A survey on student satisfaction with the quality of the study programmes is regularly conducted. This survey includes questions on student performance, examination forms, course content and implemented changes. The results of the surveys are taken into account and used for further improvement of the programmes. The results show that students in general are satisfied with the quality of the programmes. Students' and relevant stakeholders' suggestions are reflected and discussed in different department meetings.

In addition, alumni department collects, monitors, evaluates and reviews the comments and feedback from graduates and employers. The information is passed further to the relevant departments. During the visit to the university and to the internship sites, companies expressed their satisfaction with the qualifications of the KTU graduates.

9.2 Assessment

The university has established a consortium of 70 partners from all over the country, that come from different industries such as general construction, mechanical engineering, and mining. These partners work either directly or indirectly with the university. This makes the university a kind of "industrial centre as a technological partner" in the immediate region and beyond. Technological developments or innovations are thus quickly integrated into the scientific framework of the university. Indirectly, this ensures that external partners also have an influence on the content of study programmes and modules, without the partners having excessive influence on the teaching of the individual faculties.

University representatives indicated that course content is regularly updated in the various faculty curricula. In this regard, the annual revision rate was about 30% according to faculty. The opportunity for online teaching is strongly embraced by the students, as it generally allows for more flexible study. This offer is particularly in demand by students with a physical disability and also by young families, as it allows them to better organize their studies individually.

According to statements by the university management, the employment rate of students after graduation is about 95%. However, this is also partly due to conditions of the state student

grants. These include the clause that students must take up employment after graduation in order to receive benefits in the repayment of the loan.

When a new degree programme is approved, the individual concepts and orientations of each programme are discussed and debated with various groups and commissions. If the result of the commission is positive, it means that there is a need for this study programme, and it can be implemented by the university (in consultation with the Ministry of Education and Research). Accordingly, each new study programme undergoes a preliminary evaluation of success.

If the demand on the study programme is too low, the programme can be fundamentally revaluated in order to adjust the respective orientation, or even discontinue it altogether. The background to this is that financial resources for the implementation of the study programme are linked to the respective admission figures.

The university commissions its own quality management team as a central evaluation office to coordinate the individual measures for each faculty. For this purpose, the Quality Management and Accreditation Center "QMAC" conducts two anonymous evaluation loops annually by means of online surveys of students with "Univer 2.0". These surveys are also referred to as "through the eyes of the students". Students have central access to the platform and can use it accordingly, whereby social aspects such as life on campus are also included in the evaluation. Each year, a comparably large amount of data is collected, which is evaluated and subsequently published at the university. At the end of each survey, the potential for improvement among students is identified. Suitable measures are worked out and are intended to help eliminate problems as early as possible. Information from retention studies of former graduates is also taken into account. The results of the survey are incorporated into the continuing education of teaching staff in order to make them fit in various areas in which they may need to catch up.

Faculty staff and their teaching methods are generally evaluated every 3 years. If teachers are evaluated poorly several times, an independent commission is called in to deal with this specifically. The teachers are then usually given one year to correct the deficiencies and are directly evaluated again in the following year in order to be able to measure the success of the measures.

A central incentive system is, for example, the national awards for teachers ("Best Teacher of the Year"), including special remuneration and a wide range of opportunities to support research projects. According to the faculty, the university in Karaganda has about 10-12 teachers who receive this award every year.

Overall, it can be concluded that the KTU has implemented processes to review the programmes. The reviews include various instruments and ways to improve the study programmes and take into consideration the students' needs, but also of the relevant stakeholders such as industry and society.

9.3 Conclusion

The criterion is **fulfilled**.

10 ESG Standard 1.10: Cyclical external quality assurance

Institutions should undergo external quality assurance in line with the ESG on a cyclical basis

10.1 Implementation

KTU conducts on a regular basis external quality assurance procedure in accordance with the State General Education Standard and European Standards and Recommendations (ESG). The university carries out procedures for the accreditation of study programmes through national and foreign accreditation agencies and publishes information on accredited study programmes on its webpage. In 2018 the university received an institutional accreditation from a national accreditation agency in Kazakhstan.

The possible conditions and recommendations proposed during the accreditation procedure are discussed with the university management and within the faculty.

10.2 Assessment

KTU regularly undergoes external quality assurance by means of international accreditation procedures. The study programmes offered at the university are accredited either by national or international accreditation bodies.

According to the interviews conducted with the university management and the faculty, continuous quality assurance takes into consideration follow-up activities and consideration of the recommendations and suggestions provided during external quality assessment. The faculty actively discusses the possibilities of implementing proposed recommendations taking into account national legislation.

10.3 Conclusion

The criterion is **fulfilled**.

IV Recommendation to the Accreditation Commission of ACQUIN

1 **Assessment of compliance the Standards and Guidelines in the Higher European Area (ESG) in the actual official version**

The study programmes „Production of Building Materials, Products and Structures“ (Bachelor of Engineering and Technology / Master of Engineering and Technology / Master of Engineering), „Digital Technologies in Mechanical Engineering“ (Bachelor of Engineering and Technology), „Digital Aerial Photography“ (Bachelor of Engineering and Technology), „Mine Surveying“ (Bachelor of Engineering and Technology), „Embedded Digital Control System“ (Bachelor of Engineering and Technology) were assessed on the basis of the "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (ESG), and the national or other relevant regulations.

The expert group concludes that the **ESG standards** 1.1 (Policy for quality assurance), 1.2 (Design and approval of programmes), 1.3 (Student-centred learning, teaching and assessment), 1.4 (Student admission, progression, recognition and certification), 1.5 (Teaching staff), 1.6 (Learning resources and student support), 1.7 (Information management), 1.8 (Public information), 1.9 (On-going monitoring and periodic review of programmes) and 1.10 (Cyclical external quality assurance) are fulfilled.

National criteria: if applicable, national criteria are integrated in the ESG standards or listed separately.

The peer-review experts note that the recommendations from the previous accreditation procedure have been adequately taken into account.

2 **Accreditation Recommendation**

The peer-review experts recommend unconditional accreditation of „Production of Building Materials, Products and Structures“ (Bachelor of Engineering and Technology / Master of Engineering and Technology / Master of Engineering), „Digital Technologies in Mechanical Engineering“ (Bachelor of Engineering and Technology), „Digital Aerial Photography“ (Bachelor of Engineering and Technology), „Mine Surveying“ (Bachelor of Engineering and Technology), „Embedded Digital Control System“ (Bachelor of Engineering and Technology).

The peer-review experts recommend the following **recommendations**:

General recommendations

1. The module handbook as well as regular study programme plan should be structured more transparently and clearly.

2. The form and duration of the examinations should be specified in the relevant study programme documents.
3. The university should develop a long-term strategy concerning development of the resource base and acquisition of new equipment.

Recommendations for study programme „Digital Aerial Photography” (Bachelor of Engineering and Technology)

1. The university should consider renaming the study programme into “Digital Aerial Photogrammetry”.

Recommendations for study programmes „Production of Building Materials, Products and Structures” (Bachelor of Engineering and Technology/Master of Engineering and Technology / Master of Engineering)

1. The university should make a better structure of elective modules and offer more elective modules.

V Decisions of the Accreditation Commission of ACQUIN

Based on the evaluation report of the expert group and the statement of the Higher Education Institution, the Accreditation Commission of ACQUIN made on the 27 September 2021 the following decision unanimously:

General recommendations

- The module handbook as well as regular study programme plan should be structured more transparently and clearly.
- The form and duration of the examinations should be specified in the relevant study programme documents.
- The university should develop a long-term strategy concerning development of the resource base and acquisition of new equipment.

Production of Building Materials, Products and Structures (Bachelor of Engineering and Technology)

The study programme „Production of Building Materials, Products and Structures” (Bachelor of Engineering and Technology) is accredited without any conditions.

The accreditation is valid until 30 September 2027.

The following recommendation is given for the further development of the study programme:

- The university should make a better structure of elective modules and offer more elective modules.

Production of Building Materials, Products and Structures (Master of Engineering and Technology / Master of Engineering)

The study programme „Production of Building Materials, Products and Structures” (Master of Engineering and Technology / Master of Engineering) is accredited without any conditions.

The accreditation is valid until 30 September 2027.

The following recommendation is given for the further development of the study programme:

- The university should make a better structure of elective modules and offer more elective modules.

Digital Technologies in Mechanical Engineering (Bachelor of Engineering and Technology)

The study programme “Digital Technologies in Mechanical Engineering” (Bachelor of Engineering and Technology) is accredited without any conditions.

The accreditation is valid until 30 September 2027.

Digital Aerial Photography (Bachelor of Engineering and Technology)

The study programme “Digital Aerial Photography” (Bachelor of Engineering and Technology) is accredited without any conditions.

The accreditation is valid until 30 September 2027.

Mine Surveying (Bachelor of Engineering and Technology)

The study programme “Mine Surveying” (Bachelor of Engineering and Technology) is accredited without any conditions.

The accreditation is valid until 30 September 2027.

Embedded Digital Control System (Bachelor of Engineering and Technology)

The study programme “Embedded Digital Control System” (Bachelor of Engineering and Technology) is accredited without any conditions.

The accreditation is valid until 30 September 2027.