

## **Accreditation Report**

Accreditation at the

### **Karaganda State Technical University**

**5B073200 - „Standardization and Certification“ (Bachelor), 6M073200 - „Standardization and Certification“ (Master), 5B071200 - „Mechanical Engineering“ (Bachelor), 6M071200 - „Mechanical Engineering“ (Master), 6D071200 - „Mechanical Engineering“ (PhD), 5B070900 - „Metallurgy“ (Bachelor), 6M070900 - „Metallurgy“ (Master), 6D070900 - „Metallurgy“ (PhD), 5B071000 - „Materials Science and Technology of New Materials“ (Bachelor), 6M071000 - „Materials Science and Technology of New Materials“ (Master), 5B071300 - „Transport, Transport Equipment and Technology“ (Bachelor), 6M071300 - „Transport, Transport Equipment and Technology“ (Master), 6D071300 - „Transport, Transport Equipment and Technology“ (PhD), 5B090900 - „Logistics“ (Transport) (Bachelor)**

### **I. Procedure**

**Date of Contract:** 20 February 2019

**Receipt of self-evaluation report:** 19. September 2019

**Date of the on-site visit:** 3-5 October 2019

**Standing Expert Committee:** Standing Expert Committee “Engineering”

**Attendance by the ACQUIN office:** Dr. Lyazzat Nugumanova / Nina Soroka

**Decision of the Accreditation Commission:** 24<sup>th</sup> March 2020

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The **Evaluation Report** of the peer group is based on the self-evaluation report of the HEI and extensive discussions with the head of the study programme, staff representatives, students and alumni.

**Evaluation Criteria** have been the “Standards and Guidelines for Quality Assurance in the European Higher Education Area” (ESG) and the “Guidelines for Programme Accreditation Procedures” of the Accreditation Council in the actual official version. At the same time the national context, particularly the national rules regulating the establishment of study programmes, has been taken into account.

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<b>II. <u>Initial position</u></b>	

The experts would like to thank the representatives of the university 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 study programmes, but also for a better understanding of the legal and sociocultural context of the local university 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 university management, study programme coordinators, teachers, 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.

## I. Short portrait of the university

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 teachers 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 8 faculties. The 8 faculties are: architectural and construction, mining, mechanical engineering and transport and road, engineering economics and management, innovative technologies, power engineering, automatics and telecommunications, correspondence and distance learning.

## II. General information on the assessed study programmes

<b>Standardization and Certification (Bachelor of Engineering and Technology), 5B073200</b>	
location	Karaganda, Kazakhstan
date of introduction	1997
faculty/ department	Mechanical Engineering / Technological Equipment, Mechanical Engineering and Standardization
number of terms prescribed for the completion of a course	4 years/3 years/3,5 years/2,5 years
number of ECTS-Credits	260
number of study places	Up to 20 people
target group(s)	Secondary school graduates
entry requirements	upper secondary (high) school education; certificate of United National Testing with one elective subject and one profile subject

study form	Full-time/Full-time intensive/Part-time intensive/Part-time on the basis of higher education
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Standardization and Certification (Master of Engineering and Technology), 6M073200</b>	
location	Karaganda, Kazakhstan
date of introduction	2004
faculty/ department	Mechanical Engineering / Technological Equipment, Mechanical Engineering and Standardization
number of terms prescribed for the completion of a course	1,5 and 2 years
number of ECTS-Credits	102/125
number of study places	2
target group(s)	Bachelor's degree holders in engineering who wish to extend their knowledge of standardization and certification
entry requirements	Bachelor's degree diploma, entrance examinations
study form	Full-time
tuition fee	465 000 tenge

<b>Transport, Transport Equipment and Technologies (Bachelor of Engineering and Technology), 5B071300</b>	
location	Karaganda, Kazakhstan
date of introduction	2004
faculty/ department	Transport Equipment and Logistics System
number of terms prescribed for the completion of a course	full-time - 4 years; full-time reduced - 3 years; part-time reduced - 3.5 years; part-time based on higher education - 2.5 years.
number of ECTS-Credits	260
number of study places	Up to 80 people
target group(s)	Secondary school graduates
entry requirements	upper secondary (high) school education; certificate of United National Testing with one elective subject and one profile subject

study form	Full-time/Full-time intensive/Part-time intensive/Part-time on the basis of higher education
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Transport, Transport Equipment and Technologies (Master of Engineering and Technology), 6M071300</b>	
location	Karaganda, Kazakhstan
date of introduction	2006
faculty/ department	Transport Equipment and Logistics System
number of terms prescribed for the completion of a course	scientific and pedagogical - 2 years; profile - 1.5 years
number of ECTS-Credits	125 for scientific and pedagogical and 102 for profile
number of study places	Up to 50 people
target group(s)	Bachelor's degree holders in engineering who wish to extend their knowledge in transport, transport equipment and technologies
entry requirements	Bachelor's degree diploma, entrance examinations
study form	Full-time
tuition fee	465000 Tenge

<b>Transport, Transport Equipment and Technologies (PhD), 6D071300</b>	
location	Karaganda, Kazakhstan
date of introduction	2014
faculty/ department	Transport Equipment and Logistics System
number of terms prescribed for the completion of a course	3 years
number of ECTS-Credits	259
number of study places	Up to 5 people
target group(s)	Master's degree holders proficient in English language interested in an intensive scientific education and would like to prepare for work in the field of transport, transport equipment and technologies research

entry requirements	Master's degree, entrance examinations, English language test
study form	Full-time
tuition fee	740 000 t.

<b>Logistics (Bachelor of Services), 5B090900</b>	
location	Karaganda, Kazakhstan
date of introduction	2004
faculty/ department	Transport Equipment and Logistics System
number of terms prescribed for the completion of a course	full-time - 4 years; full-time reduced - 3 years; part-time reduced - 3.5 years; part-time based on higher education - 2.5 years.
number of ECTS-Credits	260
number of study places	Up to 80 people
target group(s)	Secondary school graduates
entry requirements	upper secondary (high) school education; certificate of United National Testing with one elective subject and one profile subject
study form	Full-time/Full-time intensive/Part-time intensive/Part-time on the basis of higher education
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Materials Science and Technology of New Materials (Bachelor of Engineering and Technology), 5B071000</b>	
location	Karaganda, Kazakhstan
date of introduction	2004
faculty/ department	Mechanical Engineering / Nanotechnology and Metallurgy
number of terms prescribed for the completion of a course	full-time - 4 years; full-time reduced - 3 years; part-time reduced - 3.5 years; part-time based on higher education - 2.5 years.
number of ECTS-Credits	261
number of study places	Varies depending on state quota
target group(s)	Secondary school graduates
entry requirements	upper secondary (high) school education; certificate of United National Testing with an elective

	subject "Physics" and a profile subject "Mathematics"
study form	Full-time/Full-time intensive/Part-time intensive/Part-time on the basis of higher education
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Materials Science and Technology of New Materials (Master of Engineering and Technology), 6M071000</b>	
location	Karaganda, Kazakhstan
date of introduction	2000
faculty/ department	Mechanical Engineering / Nanotechnology and Metallurgy
number of terms prescribed for the completion of a course	scientific and pedagogical - 2 years; profile - 1.5 years
number of ECTS-Credits	126
number of study places	Varies depending on state quota
target group(s)	Bachelor's degree holders in engineering or chemistry who wish to extend their knowledge of materials science and technology of new materials
entry requirements	Bachelor degree diploma, entrance examinations
study form	Full-time
tuition fee	465 000 Tenge

<b>Metallurgy (Bachelor of Engineering and Technology), 5B070900</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Nanotechnology and Metallurgy
number of terms prescribed for the completion of a course	full-time - 4 years; part-time reduced - 3.5 years; part-time based on higher education - 2.5 years.
number of ECTS-Credits	261
number of study places	Varies depending on state quota
target group(s)	Secondary school graduates

entry requirements	upper secondary (high) school education; certificate of United National Testing with an elective subject "Physics", and profile subject "Mathematics"
study form	Full-time/part-time
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Metallurgy (Master of Engineering and Technology), 6M070900</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Nanotechnology and Metallurgy
number of terms prescribed for the completion of a course	1.5 / 2 years
number of ECTS-Credits	124
number of study places	Varies depending on state quota
target group(s)	Bachelor's degree holders in engineering who wish to extend their knowledge of metallurgy
entry requirements	Bachelor degree diploma, entrance examinations
study form	Full-time
tuition fee	465 000 tenge

<b>Metallurgy (PhD), 6D070900</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Nanotechnology and Metallurgy
number of terms prescribed for the completion of a course	3 years
number of ECTS-Credits	259
number of study places	Varies depending on state quota
target group(s)	Master's degree holders proficient in English language interested in an intensive scientific education and would like to prepare for work in the field of metallurgy research

entry requirements	Master's degree, entrance examinations, English language test
study form	Full-time
tuition fee	1 480 000 tenge

<b>Mechanical Engineering (Bachelor of Engineering and Technology), 5B071200</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Technological Equipment, Mechanical Engineering and Standardization
number of terms prescribed for the completion of a course	full-time - 4 years; part-time reduced - 3.5 years; part-time based on higher education - 2.5 years.
number of ECTS-Credits	257
number of study places	Varies depending on state quota
target group(s)	Secondary school graduates
entry requirements	upper secondary (high) school education; certificate of United National Testing with an elective subject "Physics", and profile subject "Mathematics"
study form	Full-time/part-time
tuition fee	Full-time – 346600 tg., part-time – 246000 tg.

<b>Mechanical Engineering (Master of Engineering and Technology), 6M071200</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Technological Equipment, Mechanical Engineering and Standardization
number of terms prescribed for the completion of a course	1.5 years / 2 years
number of ECTS-Credits	102/125
number of study places	Varies depending on state quota

target group(s)	Bachelor's degree holders in engineering who wish to extend their knowledge of mechanical engineering
entry requirements	Bachelor degree diploma, entrance examinations
study form	Full-time
tuition fee	465 000 tenge

<b>Mechanical Engineering (PhD), 6D071200</b>	
location	Karaganda, Kazakhstan
date of introduction	2012
faculty/ department	Mechanical Engineering / Technological Equipment, Mechanical Engineering and Standardization
number of terms prescribed for the completion of a course	3 years
number of ECTS-Credits	259
number of study places	Varies depending on state quota
target group(s)	Master's degree holders proficient in English language interested in an intensive scientific education and would like to prepare for work in the field of mechanical engineering research
entry requirements	Master's degree in engineering or related disciplines, entrance examinations, English language test
study form	Full-time
tuition fee	1 480 000 tenge

...

### III. Results of the initial accreditation (if applicable)

The study programmes "Mechanical Engineering" (Bachelor/Master), "Standardization and Certification" (Bachelor/Master) were examined and accredited by the accreditation agency ASIIN in the year 2014. The following conditions were made:

General Conditions:

- The students' workload per semester must be set at a level that avoids structural pressure on training quality. In line with the ECTS Users' Guide, the workload per semester must not exceed that of a full-time employee (maximum of 900h). The ECTS credits awarded must be adapted accordingly.
- The intended learning outcomes and rules and regulations dealing with admission, examinations, final thesis, etc. must be made publically accessible to give all relevant stakeholders the opportunity to refer to it.
- The module descriptions must describe the type of examination for all modules (written, oral, project work, etc.) and the respective duration.

The conditions were fulfilled. The accreditation was issued until 30<sup>th</sup> September 2019.

To improve the study program, the following recommendations were made during the previous accreditation:

General Recommendations:

- The peer group recommends that parts of the subject-specific modules or projects should be taught in English. In consequence, the language capacities of the teaching staff would also need to be enhanced to some extent.
- The peers recommend making this issue of student workload a concern of the further development of the quality assurance mechanisms.

Recommendation "Mechanical Engineering" (Bachelor):

- The peers point out that Bachelor Mechanical Engineering is very focused on metal cutting and construction; the peers recommend broadening the topics of electives in other fields to widen the scope of mechanical engineering which must also be reflected in the equipment available at KSTU. Namely, the peers strongly encourage KSTU considering components like automation, robotics, feedback control, sensors and actuators, including engine technology as these are important aspects for an engineer. Also engineering with synthetic materials should be incorporated into the studies according to its world-wide relevance.

Recommendation "Mechanical Engineering" (Master):

- The peers recommend offering the possibility for students to deepen their theoretical basis (e.g. partial differential equations, mathematical system theory for optimizing, modelling of dynamic systems, etc.)

The study programmes „Transport, transport equipment and technology“ (PhD), „Logistics (Transport)“ (Bachelor) are being accredited by ACQUIN for the first time.

The study programmes "Materials science and technology of new materials" (Bachelor/Master), were examined and accredited by the accreditation agency ASIIN in the year 2014. The following conditions were made:

General Conditions:

- The students' workload per semester must be set at a level that avoids structural pressure on training quality. In line with the ECTS Users' Guide, the workload per semester must not exceed that of a full-time employee (maximum of 900h). The ECTS credits awarded must be adapted accordingly.
- Students must have sufficient opportunities for repeating failed exams, independent of individual permission by the department, so that the requirement to repeat whole modules does not cause extensions of the standard period of study.
- The module descriptions must be updated according to the comments made in the accreditation report (module description for each module/coherence with the syllabus/ duration and type of examinations/formal aspects of the description for master's degree programmes/to review the causality of prerequisites).
- The objectives and revised intended learning outcomes for each programme as a whole have to be specified.
- With view to internationalization and, in particular, the mobility of students rules for the recognition of activities completed at other (national and foreign) HEIs have to be adapted.
- A programme-specific document (e.g. Diploma Supplement) has to be prepared and handed out to students on a regular basis providing information about the objectives, intended learning outcomes, structure and level of the degree, as well as about an individual's performance.

The conditions were fulfilled. The accreditation was issued until 30<sup>th</sup> September 2019.

To improve the study programmes, the following recommendations were made during the previous accreditation:

General Recommendations:

- It is recommended to further strengthen the student's capability of orally discussing a problem from their specialist area and placing it in the context of a subject.
- It is recommended, with view to internationalization, to expand the mobility of students. In that respect cooperation with other HEIs, in particular HEIs abroad, should be further developed.
- It is recommended to further develop the concept of quality assurance for the degree programmes and to use the results for continuous improvements. Feedback loops in the student evaluation should be organized in a more effective manner. Furthermore, the collection of data should also include information about students' actual workload in order to allow for adjustments of the corresponding credit allocation, if necessary.

Recommendation "Materials science and technology of new materials" (Bachelor):

- To ensure that all graduates achieve the intended fundamental competences it is recommended in regard to the scientific fields (mathematics, chemistry and physics) to strengthen the curriculum.

### III. Description of facts and evaluation (according to ESG)

The quality of the courses and the compliance with European standards („Standards and Guidelines for Quality Assurance in the European Higher Education Area“ (ESG)) are assessed by the expert group. General statements express finding for all programs. Specific issues for individual programmes are only mentioned in case of deviations from general findings.

#### Part 1: 1.1 Policy for quality assurance

**Standard: 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.**

#### Description of facts

The quality assurance policy of Karaganda State Technical University (KSTU) is available on the website of the university, information stands of the university's subdivisions and in the electronic document management system.

The Department of Strategic Development includes Center of Quality Management and Accreditation. The department ensures quality management and quality assurance at KSTU. Further activities include the (re-) accreditation of degree courses and the provision of consultation to all those designing or altering degree course and course-related university regulations.

The main provisions of the Policy are stated in the Mission of the University, strategic plans, internal quality assurance standards, operational plans of departments and faculties, plans for the development of educational programs, as well as in the quality assurance procedures.

The Quality Assurance Policy emphasizes the high quality of educational services and research, comprehensive training of competitive specialists, the principle of student-centeredness, involvement of students in quality assurance processes, academic mobility of students, faculty and employees, cooperation with employers. The Quality Assurance Policy reflects the link between scientific research and training, which provides for the conduct of scientific and research work and the introduction of their results in education. Topics of Bachelor's and Master's theses and doctoral dissertations are determined taking into account the subjects of scientific research conducted by the faculty.

The policy supports values such as academic integrity and freedom, prevention of protectionism, corruption and discrimination. These values are reflected in the following documents: the Charter of the University, the Internal Regulations, the Code of Honour of Students, Master's and Doctoral students and the Code of Academic Integrity of the teaching staff and employees, the Procedure for checking student theses for plagiarism.

Feedback from relevant external stakeholders is provided through sociological surveys and questionnaires. Individual departments implementing the accredited degree programs, carry out their activities in accordance with the Quality Assurance Policy. The objectives of the educational programs fully correspond to the mission, goals and objectives of KSTU and are available on the public domain.

Employees of the University have a clearly defined range of obligations and rights, which are reflected in the Regulations on subdivisions and job descriptions.

KSTU regularly monitors employment rate of the graduates. KSTU and individual faculties as well as professors request direct and indirect feedback from the potential employers in order to ensure that the concepts of the degree programmes match actual demand of the labour market.

The university ensures transparency of the entire educational process, first of all, of the knowledge control system. The university provides a wide range of educational services to students, using modern educational technologies and ensuring continuous quality control of education. Thus, the university systematically monitors the quality of knowledge of students, the results of which are discussed at the Academic Council of the university, as well as the educational and methodical council and are used to improve the teaching process, educational technologies, teaching methods, content of educational programs and assessment tools.

Supervisory Board at the KSTU was established by the order of the Ministry of Education and Science of the Republic of Kazakhstan. The main aim of the Supervisory Board is strategic development of the university. It aims to develop the university as a center for training highly qualified specialists capable of solving fundamental and applied problems at the level of modern requirements, expert and consulting activity, introduction of the latest information and pedagogical technologies, ensuring competitiveness in the domestic and international markets of educational services.

KSTU defines and implements measures to maintain constant exchange with stakeholders regarding curricula development and degree programs, passing requests, feedback from consumers, including complaints, claims and wishes.

## **Evaluation**

The degree programmes of the university follow the rules and standards of the government (e.g. Degree No. 1080, No. 152, No. 499) and are approved according to these standards. External stakeholders are involved in the development of the study programmes. The development of the study programmes is discussed at the annual meeting of deans and heads of the departments. The overall responsibility for the development lies under the responsibility of the council of the university. Policy regulations such as university charter, internal rules, code of honor are implemented at KSTU. They are based on the university mission, strategic plans and internal quality

assurance standards. The university statement itself is described as “Preparation of highly qualified competitive specialists oriented to solution of scientific and practical tasks of the state program on forced industrial-innovative development of the country”.

The study programmes “Mechanical Engineering” (Bachelor / Master / PhD), “Standardization and Certification” (Bachelor / Master), “Metallurgy” (Bachelor / Master / PhD), “Materials Science and Technology of New Materials “(Bachelor / Master), “Transport, Transport Equipment and Technology” (Bachelor / Master / PhD) and “Logistics” (Transport) (Bachelor) complement the existing degree programmes and fit well into the eight faculties of the university.

Quality management system of the KSTU is based on the ISO 9001:2015 requirements and university management processes are in accordance with the regulations of the Republic of Kazakhstan. That means that all functions and decision-making processes are clearly defined and implemented. Quality Assurance Policy supports a continuous development between research and education. Contact persons on different topics of quality management are available on the website.

The procedures for reviewing the objectives of the study programme, the concept and its implementation are defined in accordance with the quality management system of KSTU. Various councils, expert’s consultations and evaluations help to develop study programmes. The procedures and corresponding measures are appropriate and implemented. In addition, external guidelines and advisory bodies are involved in development and review of the study programmes. Regulations of the Republic of Kazakhstan are fully taken into account in the development. The university supports gender equality on all levels including the promotion of equal opportunities.

The university has a clear defined strategy and a wide range of educational programmes, which correspond to the formation of a competitive scientific and educational potential of the country on the basis of training of engineers and technicians of the new formation, capable of practical realization of the tasks of the third industrial revolution.

## **Conclusion**

In the last accreditation it was recommended to make all regulations and rules more transparent for the students. The university has implemented necessary measures and students are sufficiently informed about relevant regulation and rules.

The criterion is **fulfilled**.

## **ESG Part 1, 1.2 Design and approval of programmes**

**Standard: 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.**

### **Description of facts study programme „Standardization and Certification“ (Bachelor)**

The Bachelor's programme "Standardization and Certification" is offered as a full-time programme with a modularized structure. The curriculum is composed of 34 modules: general subjects modules (83 credits), specialised modules (121 credits) and additional modules including Bachelor thesis (52 credits). The curriculum includes practical module: teaching practice (1 credit), internship (12 credits) and an undergraduate practice (6 credits).

The programme aims to train engineers, focusing on standardisation and certification in the field of occupational safety and health, the development of standards, quality assurance and the state of the art. Both theoretical basics and practical skills are taught.

Graduates should be familiar with moral, ethical and legal norms of the world of work. Particularly with regard to the state of the art in technology, they should be able to standardize and certify technical systems independently. The focus of the training is strongly on machine, plant and measuring technology under quality aspects as well as project management. The subject-specific qualification goals of the programme cover a broad range of topics: mathematical and scientific basics, system analysis and modelling, machine, measuring and control techniques, quality management as well as information security, business information systems, process management, project management.

Students usually take 26 to 31 credits per semester. This translates to around six modules per semester. Most modules range from three to seven credits.

In the first year, the general education modules as well as modules from the fields of mathematics, natural sciences, social and political sciences and the basics of certification and standardisation are offered. Teaching is supported by practical phases.

In the second year, specific technical modules (50 credits) in mechanical engineering and measurement technology and methods are completed.

In the next three semesters, students learn topics from the fields of "Technology, Quality Management and Organizational Processes in Metrology" including laboratory exercises and practical courses (59 credits). The last semester includes state examination (4 credits), Bachelor's thesis (8 credits) and undergraduate practice (6 credits).

### **Evaluation**

The study programme sufficiently describes qualification objectives. Since Kazakh higher education system sees a certain number of mandatory interdisciplinary basic subjects (history, foreign

languages, sports, etc.), the comparatively long duration of study seems appropriate. The subject-specific modules build on each other in a meaningful way over the course of study. The final semester is structured in a balanced way and includes practical phase, thesis and the state examination.

The qualification goals of the individual modules stated in the module handbook contribute to the overall qualification of the students according to the programmes objectives.

From the sixth semester onwards, students select one of the two specialisations (Development of information systems (IET1) and operation of information systems (IET2)). Two specialisations and their respective course programmes seem to be suitable for acquiring the corresponding skills.

With up to six courses per semester, the workload of the students is reasonable. The main modules correspond to international standards in scope (5 - 6 SWS, 150 - 180 hours workload). Attendance and self-study times are also appropriately distributed. The programme can be studied within the standard period of study.

The forms of teaching essentially comprise lectures, exercises / laboratories, projects and non-university internships. The type of teaching forms and their distribution in the curriculum correspond to the requirements of the programme objectives. Some of the recommended literature is also available in English and largely complies with international standards. Nevertheless, it would be desirable to use more up to date literature.

Numerous practical and laboratory training phases contribute to preparing graduates for the vocational requirements. According to the documents provided by the university, such as programme description, curriculum, the structure of the Bachelor's programme "Certification and Standardization" is suitable for achieving qualification goals. According to the assessment of the expert group, the programme has clearly defined and transparent objectives, which can in principle be achieved with the programme in the presented form.

The module description and the associated module handbook does not sufficiently meet the requirements for transparency and comprehensibility either in terms of content or structure. The development of a meaningful module handbook could significantly reduce the paper work of the programme and provide more clarity. In particular, the content part of the modules consists of keywords that are difficult to understand. It is difficult to recognise from the module handbook which contents are actually being taught. Therefore, the content of the modules in this programme as well as in other study programmes under accreditation here should be described more precisely. Instead of listing very general references to modern methods and approaches, the contents and methods conveyed should be named by providing examples. The topicality of the literature should be regularly checked and if necessary adapted.

## Conclusion

The criterion is **fulfilled**.

### Description of facts study programme „Standardization and Certification“ (Master)

The main aim of the Master's study programme is to train engineers, focusing on technical and organizational processes with a particular attention to the quality. Both theoretical basics and practical skills are taught.

Graduates of the programme should be able to analyse problems applying scientific methods and solve them individually and in team. Particularly with regard to the standardisation and certification of such processes, they should be able to individually analyse these systems in order to let them then become standards which must be followed and which have a binding character, since they become rules or laws.

The master's degree also entitles graduates to pursue a doctorate.

The programme is modular in structure. The curriculum of the programme consists of common (15 credits), specialised (51 credits) and additional modules (59 credits). The modules contain the most important disciplines in the field of technical innovation, research seminars and quality management, in which, on the one hand, a well-founded systematic knowledge is imparted with consideration of the latest scientific developments, and, on the other hand, corresponding competences are developed through research projects and practical phases. The requirements of professional practice are adequately reflected in the master's programme, not least due to the close cooperation with the regional industry.

During the first year of study, courses in political and social science, technical innovation methods, research methods and quality management amounting to 55 credits have to be completed.

The second academic year includes methods for quality testing, pedagogical practice and research teaching amounting to 26 credits. Further 44 credits are awarded for state examination and Master's thesis.

## Evaluation

Considering the study programme documents which include programme description, curriculum and module handbook provided by the university, the structure of the study programme is suitable for achieving the qualification objectives. Both from a didactic-pedagogical and a content point of view, the degree programme reflect the qualification objectives. From a technical point of view, training of engineers specialising in certification and standardisation should be able to set standards and rules.

The curriculum reflects a basic set of specialist knowledge to an appropriate extent and contains other specialist modules that focus on standardisation.

The model course of study reflects the qualification goals well. The subject-specific modules build on each other in a meaningful way throughout the course of study. The final semester is structured in a balanced way and includes research internship/seminar, final thesis and the state examination. The qualification goals of the individual modules stated in the module handbook contribute to the overall qualification of the students according to the study programme objectives.

With up to eight modules per semester, the workload of the students is not low. However, this is adequately compensated for by some smaller modules (e.g. Psychology, Pedagogy, 3 semester hours, 2 credits). The main modules correspond to international standards in scope (7 semester hours, 210 hours workload) and arrangement in the course of the study. The attendance and self-study times are appropriately distributed.

The forms of teaching essentially comprise lectures, exercises / laboratories, projects and non-university internships. The type of teaching forms and their distribution in the curriculum correspond to the requirements of the educational objectives. The literature recommendations are to the most extent in English and largely correspond to international standards. The literature could be updated with regard to topicality.

In particular, various practical phases contribute to preparing graduates for the demands of the labour market.

Objectives of the study programme are clearly defined and transparent. The objectives are achievable with the degree programme in the presented form.

The transparency and comprehensibility of the module handbook is given: the development of a clearer module handbook could significantly reduce the paperwork and provide more clarity. In particular, the contents in some cases consist of keywords that are difficult to understand. It is difficult to recognise what content is actually being taught. Therefore, the modules should be described more precisely with regard to the described contents - at least by way of example. Instead of making very general references to modern methods and approaches, the contents and methods conveyed should be named in an exemplary manner. When revising the modules, the topicality of the given literature should be checked and, if necessary, adapted.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme „Mechanical Engineering“ (Bachelor)**

The Bachelor's programme in Mechanical Engineering, with its basic training in social sciences, natural sciences, economics, engineering and technical subjects in mechanical engineering, aims to train qualified specialists for employment in mechanical engineering companies of importance to the region. An important qualification goal is the professional preparation of the students for

an activity in modern production plants by applying new scientific-technical knowledge. Both theoretical basics and practical skills are taught. In addition to technical objectives, the programme also pursues personality development that enable students to work independently as well as in teams.

The Bachelor's programme in Mechanical Engineering is designed for a standard study period of four years (8 semesters) in direct study (full-time). The curriculum includes general subjects (44 credits), basic subjects (110 credits) and profile subjects (51 credits). Thus, 205 credits can be earned in theoretical education in the form of seminars. In addition, 19 credits are awarded for practical parts, 12 credits for the state examination in the subject area and the preparation/defence of the final thesis as well as 21 credits for additional modules (religion, anti-corruption, social awareness) and sport, so that students earn in total of 257 credits.

The programme is designed in such a way that five to eight courses are planned per semester, whereby these have a scope of three to six credits. Thus, 28 to 31 credits are earned in each semester.

Students choose one of the specialisations along the three profile lines:

- Mechanical engineering technology, metalworking machines and tools,
- Technology of mechanical engineering, constructive and technological production support,
- Equipment and technology for welding production,

The first study year emphasizes general scientific and technical basic subjects as well as national or a foreign language subjects. In the third and fourth semester, students learn important engineering and socio-economic fundamentals supplemented by a professional language training. The core curriculum in the first four semesters is the same for all profile lines. The next three semesters (5 to 7) are characterized by profile building according to the chosen specialisation. In this part of the course, students acquire engineering, technical and organisational skills necessary for the subject area, with approximately two-thirds of the subjects differing in the three profile lines. Thus, there is a sufficient differentiation between the three profile lines. However, the choice is limited to the selection of the profile line.

During course of the study, students are required to engage in several mandatory internships: internship after the second semester (basic internship, 1 credit), internship after the fourth semester (professional internship, 6 credits) and after the sixth semester (constructive-technological internship, 6 credits) as well as in the eighth semester (pre-diploma internship, 6 credits). This practical experience serves for professional qualification and orientation as well as for the selection of the topic for the Bachelor's thesis.

Finally, the eight semester is dedicated exclusively for the pre-diploma internship as well as the preparation and defense of the Bachelor's thesis, whereby the state examination in the field of study must be completed beforehand.

In addition to the four-year full-time direct study programme described here, the study programme is also available shortened by one year and as a distance study course.

Bachelor's programme has a modular structure. The modules combine three to seven courses in the Bachelor's programme of Mechanical Engineering and extend over two to three semesters, one module over four semesters. Courses in foreign languages are rather rare. The learning outcomes for each module are laid down in the module handbook. The workload of the students is given as 27-30 hours per credit, of which 9-10 hours are classroom teaching and 18-20 are self-study.

Students in the Bachelor's programme undergo the programme in groups. Students can choose one of three profile lines after the fourth semester, in which the corresponding modules have to be completed. The last semester serves the individual preparation and defense of the final thesis as well as the execution of the professional state examination. The proportions of attendance time and self-study time shown are in a ratio of 1/3 to 2/3 and seem appropriate.

## **Evaluation**

The Bachelor's programme "Mechanical Engineering" with regard to the qualification goals pursued is structurally coherent. Courses are arranged in a meaningful way throughout the study programme, starting with the general education subjects, through the basic subjects to the profile-building subjects. The subject-specific modules build well on each other over the course of the study. The three mandatory internships are arranged 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 a practical phase, the thesis and the state examination.

The learning outcomes of the individual modules stated in the module handbook contribute to the overall qualification of the students according to the goals of the programme. The modules content deliver the specialist and methodological competences required for the Bachelor's degree. The differentiation into three specialisations is historically conditioned. The three specializations are machine tools, production technology and welding technology. Students acquire appropriate abilities and a specialization of the graduates is reached.

The workload of the students is quite high with seven to eight modules in the first five semesters and decreases slightly in the sixth (6 modules) and seventh semesters (5 modules). The workload per semester is between 810 and 855 hours, plus 30 and 150 hours for the internships during the break between autumn and spring semesters and the additional modules. Against the background

of the high graduation rate within the standard period of study, the study programme is generally assessed as good for study. Nevertheless, the workload of the students in the first four semesters should be distributed more evenly. The attendance and self-learning times are appropriately distributed and allocation of credits according to the student effort is considered plausible.

The forms of teaching include 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 objectives. In particular, various practical phases contribute to orientation and preparation for the vocational requirements of the graduates. Within the framework of academic mobility, three students have spent time abroad in the Czech Republic, Latvia and Russia and 38 students have completed internships abroad at the Minsk tractor factory (Belarus). The academic mobility of the students can be however further expanded.

The connection between the university and the industry as well as the relevant companies is very close. Companies are intensively involved in the design of the degree programme and some of the lecturers in the programme are industry practitioners. This means that labour market requirements are taken into account in the further development and design of the programme.

In accordance with the documents provided by the university such as programme description, curriculum and module manual, the structure of the Bachelor's programme "Mechanical Engineering" appears to be suitable for achieving qualification objectives. The module handbook should however, contain additional information on the type, scope and duration of the examinations. The differences between the elective modules in the basic studies of the first four semesters (e.g. Chemistry or Chemical Elements) are not properly apparent to the expert group, especially since according to the curriculum only one subject (Chemistry) is taught. The elective modules should be checked for content overlaps. Both from the point of view of content and didactic pedagogy, the study programme basically reflects the qualification objectives.

The objectives of the study programme "Mechanical Engineering" (Bachelor) are clearly defined and meaningful for the educational needs in the Karaganda region and throughout Kazakhstan as an industrial country rich in raw materials. The programme objectives are transparently presented in the relevant documents.

The concept of the study programme is overall coherent and suitable for achieving the programme objectives. The modules build well on one another and qualify graduates on a basic professional level (Bachelor). Studying is possible throughout, which is underlined by a low dropout rate. The academic success and student satisfaction are high and the prospects for an employment after graduation are very good.

The "Mechanical Engineering" study programme thus covers the specialist disciplines necessary for the qualification of students in the desired occupational fields of industry or higher education/university.

## Conclusion

The criterion is **fulfilled**.

## Description of facts study programme „Mechanical Engineering“(Master)

The Master's programme aims to train qualified specialists in the field of mechanical engineering considering the local job market or for a scientific career at a university or research institute. The programme expands upon the Bachelor's programme "Mechanical Engineering", in which the fundamentals are taught. The programme aims at an in-depth education dedicated to specific problems and topics as well as methods of the above-mentioned industry (e.g. quality management or research organisation). In addition to the purely technical qualification goals, sufficient non-technical goals that serve the general and social development of personality (e.g. pedagogy, psychology) are also considered. Students are thus qualified to work in industry or research.

Graduates should be able to analyse and solve problems using scientific methods, both independently and as part of a team. They will be able to carry out organisational and administrative management tasks and to work as researchers in various institutions. In addition, the Master's degree enables them to teach at universities in the field of scientific-pedagogical orientation through a subsequent doctoral programme.

With the Master's degree, graduates can obtain further qualifications in a PhD study programme.

The Master's programme is offered as a full-time 2 year (scientific-pedagogical orientation) or as 1.5-year (application-oriented orientation) study programme and has a modular structure. The curricula structure includes basic subjects (31 credits) and profile-building subjects (35 credits), which are grouped into five modules. These include both compulsory and optional subjects. Thus, 66 or 59 credits can be earned in theoretical training in the form of courses. In addition, 15 credits are allocated for practical parts, 4 credits for the state examination in the subject area and 40 credits for an individual academic work and the preparation/defence of the Master's thesis, so that students earn a total of 125 credits. The scientific work is distributed over all four semesters with 7 credits each (a total of 28 credits) and is integrated into current research projects. In addition, a Master's programme shortened to one year is offered for the further qualification of employees from industrial companies.

In the first year of study, five compulsory modules (4 general, 1 subject-specific) and eight optional modules (1 general, 7 subject-specific) amounting to 49 credits have to be completed. In addition, the pedagogical internship (3 credits) is offered.

In the third semester students take three subject-specific modules as elective modules (17 credits) and engage in a research or company internship (12 credits). During the fourth semester students take the final state examination (4 credits) and work on their Master's thesis (12 credits). The scientific work previously completed and awarded with 28 credits is to be integrated into the

Master's thesis. In the case of shorter Master's programmes, the scope of study is reduced accordingly and the programme is more career-oriented.

In the Master's programme, a module consists of two to five courses, mainly covering one, but also two and three semesters.

Similar to Bachelor's programme, students in the Master's programme undergo the programme in groups. The individualisation of the programme takes place via eleven optional modules, which corresponds to approx. 2/3 of the total number. The last semester serves the individual preparation and defense of the final thesis as well as the execution of the professional state examination. The proportions of attendance and self-study time are in a ratio of 1/3 to 2/3 and seem to be appropriate.

### **Evaluation**

The structure of the study programme according to the documents provided by the university (programme description, curriculum and module handbook) seems suitable for achieving the qualification objectives. Both from a didactic-pedagogical and content point of view, the degree programme basically reflects the qualification objectives.

The subject-specific modules build on each other in a meaningful way and the general education modules contribute to the personal development of the students. The final semester essentially serves the academic work and the composition of the final thesis as well as the state examination, whereby the academic work is carried out parallel to the studies and its results are to be summarised in the last semester in the master's thesis. The topics of the Master's theses are derived from the current research or industrial projects, which shows the good integration of the students into the current research work.

The three different Master programmes aim at different qualifications to be acquired

- 2 years: scientific-educational training with the ability to move on to a PhD,
- 1.5 years: vocational training for a higher activity in industrial enterprises,
- 1 year: further qualifying training for employees from industrial companies

which meets the various requirements of science and industry. A transition between the Master programmes is possible.

The workload of the students is quite high with seven and six modules in the first two semesters, leaving little time for research work. Research work is more strongly integrated into the curriculum of the second academic year. The attendance and self-study times are appropriately distributed and the allocation of credits according to the student's effort is considered plausible. The programme can be studied within the standard period of study.

The teaching methods essentially comprise lectures, exercises/seminars and internships that contribute to scientific or professional work as well as pedagogical training. The type of teaching methods and their distribution in the curriculum correspond to the requirements of the educational objectives. International cooperation with other universities has made it possible for a number of students to spend time abroad (e.g. in Vilnius and Prague), but the mobility can be expanded further.

The qualification goals of the individual modules stated in the module handbook contribute to the overall qualification of the students according to the study programme goals.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme „Mechanical Engineering“(PhD)**

The three-year doctoral programme "Mechanical Engineering" aims to provide research-oriented training to mechanical engineers who are qualified to work in academia and in industry. The graduates can pursue a scientific career at a research institutes/university or carry out research in companies by applying scientific methods in an innovative way and by organizing and leading the scientific research work. The corresponding qualification goals are adequately described in the self-evaluation report. A very independent way of working is required to achieve them.

Admission requirements are four-semester Master's degree with a scientific-educational orientation and a final grade of better than 4.5.

In the first semester, additionally specialist and methodological competences are imparted within the framework of four specialist optional modules for the automation of production by means of CAD/CAM, for the technical and economic evaluation of projects, for computer-aided process modelling, for strategic and risk management as well as for system analysis and diagnosis, amounting to 20 credits and technical foreign language training (5 credits). Theoretical training is supplemented in the second semester by an educational internship (6 credits) and by a research internship (8 credits). PhD students 6000 hours (200 credits) allocated to the individual research work and the preparation of their dissertation. The research topics are derived from scientific research projects at the university and local industrial projects. PhD studies are completed with the professional state examination and the defense of the dissertation (20 credits). Thus, a total of 259 credits can be earned.

In the PhD programme there is essentially only one module with four courses and one language module, which extend over one semester.

Students in the first semester of the PhD undergo the programme in groups.

## Evaluation

The PhD programme "Mechanical Engineering" is characterised on the one hand by clearly defined state requirements with regard to the admission requirements and the allocation of credit points and on the other hand, approximately 75% of the course contents with scientific research work and the preparation of the dissertation are very general. This requires a high degree of independence and work discipline when working on the dissertation. The 259 credits are very high for a three-year doctoral degree course and correspond more to a four-year degree course.

The knowledge acquired in the courses at the beginning of the PhD studies programme complements very well the technical and methodological competences acquired in the Bachelor's and Master's programmes "Mechanical Engineering" and is helpful for further scientific qualification. The time allocated to the student's own research activities allows him or her to deal scientifically with current issues in the discipline, which are dealt with within the framework of research and industrial projects. This requires access to current national and international publications, which are made available via the library. Further efforts should be made to expand international exchange and improve student mobility.

Doctoral students participate in national and international conferences and the university provides additional support.

The formulated qualification goals and methodological concepts appear to be conclusive and suitable for the achievement of the goals. Students are able to further develop their leadership and teamwork skills.

The doctoral programme prepares high-quality personnel for industrial research and young scientists for universities that are on demand on the national and international labour market.

## Conclusion

The criterion is **fulfilled**.

### Description of facts study programme „Metallurgy“ (Bachelor)

Kazakhstan belongs to the country rich with premium steel, non-ferrous and raw materials industries, used for self-consumption as well as for export of the ferrous or non-ferrous products. As for, in year 2014, Kazakhstan exported 1,581 million tons of rolled steel products and 4,645 million tons of iron ore. The demand for specialists in the steel and non-ferrous industries is high.

The study programmes in Metallurgy (Bachelor, Master, and Ph.D.) at the KSTU prepare specialists mainly for local labor market. The programmes are developed based on regulations of the Republic of Kazakhstan and on standards within the Bologna process and thereby, show explicit intended learning outcomes, which reflect the qualification levels and key competencies of the graduates.

The full-time Bachelor programme has a modular structure. Duration of study is 4 years for secondary school graduates and 3,5 years for college graduates under relevant areas of specialization with number of credits as 240 and 210 credits respectively.

The curriculum covers subject areas such as Ferrous and Non-Ferrous Metals Metallurgy, Foundry, Metal Science and Heat Treatment. Courses are held in Kazakh, Russian and English.

Admission requirements are (i) certificate of completion of secondary school or college and (ii) certificate of passing the “Unified National Testing” with profile subjects physics and mathematics.

The programme includes general disciplines, basic disciplines and major disciplines with several mandatory and elective courses. General discipline modules covers subjects such as history, philosophy, foreign language, social-political knowledge and others. Basic Disciplines provides students with knowledge in the field of STEM (science, technology, engineering and mathematics), which are prerequisite for majors discipline modules.

The Bachelor programme “Metallurgy” aims to provide fundamental knowledge in the field of natural sciences, physical and mathematical disciplines, theory and technology of metallurgical processes, raw materials, production of ferrous and non-ferrous metals and alloys, metal forming, foundry, metallurgical equipment and automation of metallurgical production, foundry, heat treatment and metal science.

The programme structure features a good mix of practical skills and methodological competencies. It includes such modules as Information and Communication Technologies (5 credits) in the first semester, Law Basics (5 credits), Engineering Enterprise (6 credits), Educational Practice internship (5 credits) in the second semester, Internship 1 (5 credits) in the fourth semester, Internship 2 (5 credits) in the sixth semester followed by an Undergraduate Practice (5 credits) in the eighth semester.

Students acquire essential professional, methodological, personal, social and pedagogical competences. Students are able to acquire or improve language skills in Kazakh or Russian language (10 credits) and foreign language (10 credits) during the first two semesters and foreign language for special purposes (5 credits) in the sixth semester.

The programme structure consists of mandatory and elective courses, such as self-knowledge, history, philosophy, social-political knowledge and others that allows for an individual development as an active and responsible member of the society.

There is no explicit mobility window for a semester abroad in the curriculum. The university holds various agreements with foreign universities and offers students to spend a semester abroad, thereby the university fulfils conditions Erasmus+ in the mobility preparation, development and recognition of the mobility results.

Industry representatives are actively involved in teaching process, thereby, adequately reflecting the requirements of a professional practice. The curriculum is discussed with the industry representatives and updated accordingly. In addition, some specialist courses are held directly by the industry practitioners. Internship is a core component of the Bachelor's programme with an aim of gaining practical experience in a professional environment and learning about best practices. Internships are carried out on the basis of agreements with industry and research institutions. Practical part of the programme consists of educational practices (5 credits), internship 1 and 2 (10 credits) and pre-graduation practice (5 credits).

Student performance level has increased (89.4% as of 2018-2019). The employment rate of graduates is high, near to 100%, which demonstrates that the quantitative objectives of Bachelor's programme "Metallurgy" (number of study places, applications, enrolments, number of terms prescribed for the completion of a course and others) are achievable.

### **Evaluation**

The objectives of the study programme, general qualifications and target groups are described in the regulatory documents and in the Diploma Supplement.

The study programme in Metallurgy is designed in such a way, that it will provide students with specialist and interdisciplinary knowledge, professional, methodological and generic competencies. The content and competences are appropriate with regard to the Bachelor degree level.

The study programme includes practical phase (20 credits) i.e. internships conducted at the industry. The expert group recommends to increase the share of practical exercises.

The course titles correspond to the course contents (it would be desirable to rename the course "Fundamentals of Ladle Refining" as "Special Metallurgical Technology" or "Secondary Metallurgy"), thereby, the content of the degree programme is appropriate.

Overall, the study programme reflects the four purposes of higher education in the Council of Europe such as preparation for sustainable employment, preparation for life as active citizens in democratic societies, personal development and development and maintenance through teaching, learning and research of a broad advanced knowledge base.

Students and industry are involved in design and development of the programmes. Student representatives actively participate in special meetings and advisory councils where the design and configuration of the study programs are presented and discussed. Representatives of the industry provide their recommendations for updating the teaching content. Industry practitioners also hold lectures at the university. Due to the close proximity to research institutes and industry, industry practitioners teach in several courses.

Students have the opportunity to work on current research or industry projects. Final thesis topics are practical industry or research oriented. In addition, university offers several research clubs run by the professors where students can take part in actual research.

The study programme reflects current research topics. The topics for the student thesis reflect the current research projects conducted at the KSTU. The study contents, e.g. the lectures in fields of nanotechnology and circular economy give students modern insights in these areas. The lectures in the field of automation, modelling and simulation provide knowledge of Industry 4.0.

The size of the modules along with ratio of attendance to self-learning times is appropriate. The module descriptions are complete, competency-oriented and informative. Study programmes with regards to student workload and study plan design are appropriate. High academic performances of students, low dropout rate and high percentage of employment demonstrate this.

### **Conclusion**

The criterion is **fulfilled**.

### **Description of facts study programme „Metallurgy“ (Master)**

The Master's programme "Metallurgy" (Scientific programme duration: 2 years and Profile Master duration: 1,5 years) is offered as a full-time study program with 120 and 90 credits respectively. The programme offers in-depth training in areas of metallurgy. The fields covered are ferrous and non-ferrous metals and alloys metallurgy, metal science and heat treatment of materials and nanotechnology in metallurgy. A medium of instruction is Kazakh, Russian and English.

The admission requirements are English language skills (IELTS with at least 4.5 for overall score) and three entrance examinations.

The objectives of the study programme are sufficiently differentiated from qualification objectives of the Bachelor programme. The aim of the "Profile Master" Metallurgy (1,5 year) is to train professional specialists with in-depth knowledge and skills in all aspects of metallurgy. The aim of the "Scientific Master" Metallurgy (2 years) is to prepare specialists with scientific and pedagogical skills for a career in the field of research.

The curriculum is composed of the Common and Speciality Modules, which enable students to acquire professional, pedagogical, research, personal and social competences. Common Modules (21 credits) include Professional foreign language (3 credits), Psychology (3 credits), Pedagogics (3 credits), Methods of teaching technical disciplines (3 credits), Methodology of scientific research (3 credits) and others.

Speciality Modules cover several fields of metallurgy (e.g. Modern Processes and Aggregates in Metallurgy, 5 credits), management (e.g. Creative Management, 5 credits), circular economy (e.g.

Technogenic Waste and Secondary Raw Materials in Metallurgy with 5 credits) and Nanotechnology (e.g. Special methods for Nanostructures Research, 5 credits) with a strong focus on international experience. Employees and students have electronic access to the worldwide full-text databases such as: Elsevier, Scopus et al.

The Master's programme is accompanied by practical modules such as Pedagogical Practice (3 credits) and Research Practice (12 credits). Students have an opportunity to gain practice directly at companies or at research institutions. Topics of the current research projects at the university are offered as topics for Master's thesis along with the possibility of writing thesis in collaboration with a company.

The degree qualifies graduates to work independently and to take on managerial roles in the field of metallurgy. It also entitles graduates to embark on doctoral studies. Graduates find employment shortly after the graduation. The employment rate of graduates is nearly to 100%.

### **Evaluation**

The objectives of the study programmes, general qualifications and target groups are adequately described in relevant documents and in the Diploma Supplement for each programs undergoing the accreditation process (Bachelor, Master, Ph.D.).

The expert group recommends that the master's degree students should get more practice in research.

Overall, the study programme reflects the four purposes of higher education in the Council of Europe such as preparation for sustainable employment, preparation for life as active citizens in democratic societies, personal development and development and maintenance through teaching, learning and research of a broad advanced knowledge base.

The structure of the programme, methods of teaching and content of the courses allow students to develop personally and professionally and provide them with an opportunity for informed participation in society.

The study programme reflects current research topics. The topics for the student thesis reflect the current research projects conducted at the KSTU. The study contents, e.g. the lectures in fields of nanotechnology and circular economy give students modern insights in these areas. The lectures in the field of automation, modelling and simulation provide knowledge of Industry 4.0.

The size of the modules along with ratio of attendance to self-learning times is appropriate. The module descriptions are complete, competency-oriented and informative. Study programmes with regards to student workload and study plan design are appropriate. High academic performances of students, low dropout rate and high percentage of employment demonstrate this.

## Conclusion

The criterion is **fulfilled**.

## Description of facts study programme „Metallurgy“ (PhD)

The duration of the full-time PhD study programme in Metallurgy is 3 years (6 semesters). The main subject areas are scientific and pedagogical activity, ferrous and non-ferrous metals and alloys metallurgy, metal science and heat treatment of materials, nanotechnology in metallurgy.

Admission requirements are a completed Master's degree, English language test (IELTS with at least 4.5 overall score) and two entrance examinations. Currently nine students are enrolled in the programme.

The aim of the PhD programme is to prepare specialists with advanced scientific and pedagogical knowledge in the fields of iron, non-iron metallurgy, modelling and simulation of metallurgical processes and special metallurgical technologies.

In order to graduate students need to obtain 259 credits. The programme is composed of Base Modules, Profiling Modules, Practice Modules, Modules Research Work and Modules Final State's attestation. In the Base Module (10 credits) students gain skills in current trends in metallurgy, strategic management and thermo-chemical simulation of metallurgical processes. Profiling Modules (15 credits) provide students with skills in modelling and special metallurgical technologies. The PhD programme includes practical components such as Pedagogical Practice (6 credits) and Research Practice (8 credits). Students can complete practice modules in industry.

Double supervision of a dissertation, with the second supervisor as professor from the partner university from abroad (Russian Federation, Belarus, China, France, etc.) is a requirement at the KSTU. Students have an opportunity for a research stay at the partner university in order to access modern research facilities. The topics of the dissertations are largely determined by an industry and research partners, thereby students are able to conduct their research on the plants of the partners (e.g., at arc melting furnace of Chemical and Metallurgical Institute named after Abishev). The programme concludes with a final state examination, which consists of a comprehensive examination, writing and dissertation defense. Students receive pedagogical, professional and research competences with high employment rate of nearly 100%.

## Evaluation

The objectives of the study programme, general qualifications and target groups are adequately described in regulatory documents and in the Diploma Supplement. The objectives of the programme as well as curriculum are adequate and enable students to develop as researchers. Students receive regular and good supervision from their PhD advisors.

PhD programme has a sufficient share of practical parts (14 credits) and the majority of the study programme consists of research. Students participate actively in various scientific conferences and seminars. Moreover, the curriculum and structure of the programme enables students to improve their interpersonal and communication skills.

Overall, the study programme reflects the four purposes of higher education in the Council of Europe such as preparation for sustainable employment, preparation for life as active citizens in democratic societies, personal development and development and maintenance through teaching, learning and research of a broad advanced knowledge base.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme „Materials Science and Technology of New Materials“ (Bachelor)**

The main objectives of the Bachelor's programme are to provide industries with qualified personnel, meeting modern requirements of society, science and technology in the field of technology of receiving new materials and products and equip graduates with a free, physically healthy, spiritually rich, moral personality that contribute to the consolidation of Kazakh society, professionally demanded in the domestic and international labour markets, focused on training and lifelong education.

The programme was developed according to the normative documents of the Republic of Kazakhstan as well as to the requirements of international standards within the Bologna process. The programme is offered as a full-time course with 208 credits /129 credits (regarding the Kazakh system). Depending on the entrance level of the individual student, the study duration varies between 2,5 and 4 years. For example, graduates from technical schools with a secondary technical and vocational education are accepted to the „Accelerated Educational Programme“ with a 3-year study period.

The study programme contains the study of general education cycles (GED) covering Kazakh, Russian and foreign language in general as well as for professional use and also further modules like Kazakh History, Philosophy and Ecology. Cycles of general education disciplines account for 22% of the workload.

The subject-specific education is divided in basic (BD) and major (MD) disciplines. Basic disciplines (BD – 53%) comprise general science and engineering modules such as Mathematics and Physics, Physical and Mechanical Properties or Modern Methods of Research. The disciplines provide a profound base for scientifically oriented studies as well as for a professional career. The major disciplines (MD – 25%) contain mandatory and elective disciplines. The cycle of majors allows students to gain theoretical knowledge and practical skills, abilities and competencies in the field

of smelting and technological conversion of metals and alloys, the creation of new functional materials for modern purposes based on non-metallic and metallic materials, whereas the focus lies on metals. For specialization purposes, three different Educational Programmes defined. Students can choose between following specialisations “Constructional Materials”, “Non-metallic Materials” and “Composite Materials”.

Since the admission of applicants for the study programmes strongly correlates to the number of available state grants (for the particular programme), the number of freshmen in 5B071000 varies from year to year. Ongoing monitoring of the student achievement shows a constantly high level.

### **Evaluation**

The objectives of the study programme, general qualifications and target groups are adequately described in the regulatory documents of training and examinations (Appendix 4a and 6a) and in the Diploma Supplement (Appendix 10a) for the Bachelor programme undergoing the accreditation process.

Due to the Common Modules (which are the same for all engineering study programmes) the programme allows students to acquire important general competences, including professional, methodological, personal, social and language competences. Students take either Kazakh or Russian language (9 credits), foreign language, e.g., English language over the course of the first and second semester (9 credits), foreign language for special purposes over the course of the fourth semester (3 credits) and Kazakh language for special purposes in the third semester (3 credits).

Nine Specialty Modules (with up to 20 credits each) include theoretical and practical aspects of materials, the production thereof, characterization methods, IT-tools and further methods. The Modules with Basic Discipline courses start in the second semester with one mandatory course. Starting from the third semester students have the choice between two different courses depending on their interests and the chosen Major Discipline. In the modules Production Design, Design of Technological Processes and Materials and Information Technology students can choose their Major Discipline by selecting the offered elective modules, depending on their own interest.

Considering the title of the programme in particular the part “technology of new materials”, it should be checked whether it is possible to include more courses dealing with “hot topics” in material sciences. The “Technology of New Materials” area should gain greater attention in the goals and contents of the programme.

Sufficient time before the semester starts every student receives an Individual Educational Programme of Student (example see Appendix 5a) formulated and signed by a personal advisor and the student.

Graduates of the Bachelor programme are in high demand on the local Kazakh labour market, which is confirmed by a high level of employment. Graduates work mainly in coal and steel industry, but also in research institutes. According to the survey of graduates, 78 to 94% of all graduates between 2015 and 2018 have found employment. The data shows that the number of employed graduates has increased. The university systematically monitors employment of graduates.

Internship is an integral part of the study programme; it aims at applying theoretical knowledge into practice and learning best practices. General cooperation agreements are signed between the KSTU and institutions that provide internship opportunities to students. Students are required to complete an educational practice (2 credits), an internship (18 credits) and an undergraduate practice (6 credits). Students can find an internship position themselves or with the help of the university.

The number of study rooms is sufficient. Groups consist of a small number of students (usually less than 20), elective and English courses usually consist of less than 10 students. Best students get into the university (almost all of them get scholarships), students study hard in accordance with the requirements of training and pass examinations, so the drop-out rate is very low as is the number of failed examinations. Students who fail an examination can retake the course in the next semester for an additional fee. The number of examination attempts for an additional fee is unlimited.

The study programme is in high demand but the number of enrolled students is constantly decreasing. University should develop a concept and implement measures to attract more students and counter the decline in the number of students.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme „Materials Science and Technology of New Materials“ (Master)**

The study programme was developed according to the normative documents of the Republic of Kazakhstan as well as to the requirements of international standards within the Bologna process. The full-time programme consists of 126 ECTS-Credits /59 Kazakh system credits. Depending on the aimed graduation focus of the individual student, the study duration is either 2 (including an pedagogical part) or 1,5 years. Graduates of a 2-year programme usually pursue a doctorate degree.

The objectives of the Master's study programme includes the education of graduates

-providing a pronounced professional component and consists in training new types of personnel demanded in the labour market,

- by developing full competencies in their chosen field of activity, striving to fully reveal their intellectual, professional potential and differing in a conscious attitude both to the general direction of social development, and to various forms of its social and cultural life,

- integrating into the international educational space by harmonizing the constantly updated accredited educational program of higher and postgraduate technical education with the educational programs of leading foreign technical universities,

The students are enabled to

- independently master new research methods and to change the scientific and scientific-production profile of their professional activities,

- to extract knowledge using modern technologies and use them in practical professional activities,

- use their analytical skills, leading to a systematic approach to solving problems in the field of materials science,

- practice a professional communication and intercultural communication

- formulate correct and logical design of their thoughts in oral and written form.

In the 2-years study programme additional pedagogical and communicative skills are developed. This includes educational and pedagogical activities on the credit technology of education, practicing methods of teaching professional disciplines, using modern information technologies in the educational process and expanding and deepening knowledge for everyday activities and continuing education in further doctoral studies.

The curriculum comprises theoretical training, including the study of cycles of basic and core disciplines; practical training of undergraduates: various types of practices, professional internships; research work, including the completion of a master thesis; intermediate and final certification. Common modules include History and Philosophy of Sciences, Psychology, Pedagogy and Professional Language e.g.

The curriculum consists of basic and major disciplines, which contain compulsory and elective parts with more than 50 % of electives. Students have the choice between the courses with focus on metals or on non-metallic materials. Specialty Modules contain disciplines such as Creating Materials, Computer Modelling, Modern Characterisation Methods, Protection and several other aspects of the chosen material class.

Since the admission of applicants for the study programme strongly correlates to the number of available programme specific state grants, the number of students in 6M071000 varies from year to year. Ongoing monitoring of the student achievements shows a constantly high level of academic achievements.

## Evaluation

The objectives of the study programme, general qualifications and target groups are sufficiently described in the regulatory documents of training and examination and in the Diploma Supplement for the Master's programme undergoing the accreditation process.

Considering the title of the programme in particular the part "technology of new materials", it should be checked whether it is possible to include more courses dealing with "hot topics" in material sciences. The "Technology of New Materials" area should gain greater attention in the goals and contents of the programme.

The programme starts with Common Modules (which are the same for all engineering study programmes and counts in sum 18 credits, 50 % compulsory and 50 % electives) to improve the student's general competences, including psychology, pedagogy and language competences (e.g. Kazakh business language 3 credits).

Five specialty Modules (with up to 11 credits each) include courses on computer modelling, development of new materials, strategies for scientific research, novel characterization methods, but also topics with respect to environmental protection. Basic Discipline courses are offered in the first and second semester with just one mandatory course. In each semester students have the choice between two different courses of interest and the chosen major discipline. Topics from ongoing national and international projects are reflected in several courses.

The practical phase includes a "Pedagogical practice", that is designed as an undergraduate instruction and a "Research practice" that is carried out as a lab project, often at the Chemical and metallurgical Institute named after Zh. Abishev.

There is no explicit international mobility window in the study programme.

Both programmes in "Materials technology and technology of new materials" correspond to the overall strategy of the university. The qualification objectives of the master programme is partially a comprehensive enhancement of the Bachelor programme and embraces in parts different objectives than the basic degree programme. The scope of compulsory and elective courses in the basic and major modules are appropriate.

The overall workload of the modules is adequate and has a balanced proportion of contact and self-study hours.

Regarding the recognition of activities carried out at the foreign universities or in institutions/educational environments, rules for recognizing these activities were adopted, especially with a view to internationalization and, in particular, student mobility. The activities are documented in a Diploma Supplement.

The methods and system of examinations were improved by the introduction of a broader spectrum of types of examination. A special focus was set on strengthening student's ability to present and discuss verbally the topics and problems in his or her field of specialisation and place it in the context of the subject matter.

Different abbreviations for the same course in documents provided were noticed. In the next revision, a systematic unification could be pursued.

The study programme is in high demand but the number of enrolled students is constantly decreasing. University should develop a concept and implement measures to attract more students and counter the decline in the number of students.

### **Conclusion**

KSTU managed to substantially improve its programmes within the last five years since the previous accreditation in 2014. Recommendations for more transparent presentation of training programmes were taken into account. In the Modular Educational Programme Handbook a detailed description of the learning objectives, instruction methods and expected learning outcome is provided. A detailed syllabus is available for each course.

The criterion is **fulfilled**.

### **Description of facts study programme "Transport, Transport Equipment and Technology" (Bachelor)**

The main aim of the study programme is to prepare highly qualified specialists in the field of transport, transport equipment and technologies. Students acquire a high level of professional and moral qualities and are capable of independent thinking in the globalized world. Students gain skills in the field of research, design, operation and repair of transport equipment.

The Bachelor's programme is designed in accordance with the requirements of the State mandatory standard of higher and postgraduate education. The programme has a modular structure.

The programme is comprised of 24 modules with 260 credits. Students take 6 to 8 subjects per semester, so that overall workload ranges between 26 and 31 credits per semester.

The curriculum includes general modules (66 credits), speciality modules (142 credits) and additional modules (52 credits). The category of specialty modules consists of

- Module of General Professional Disciplines (electrical engineering and electronics fundamentals, theory of machines and mechanisms, machine parts),
- Module Professionally Oriented (fundamentals of technical operation of transport technique, power plants of transport technique),

- Module of General Engineering Disciplines (engineering graphics/descriptive geometry, basics of interchangeability, theoretical and applied mechanics, strength of materials),
- Module of Basics of Transport Equipment (Hydraulic and pneumatic actuator, classification and device of transport technique/basics of the construction of transport technique, base chassis/theory of transport technique, reliability of transport technique/fundamentals of operational reliability),
- Module Organization of transportation and production operation of transport equipment (conversion processes in the life cycle of machines/transport logistics and the basics of freight forwarding services, production operation of technological machines/management of operability the transport technique, labor protection and basics of life safety/civil protection, marketing and business planning/project management),
- Module Theory of transport equipment, modelling and automation (technical means of automation of RBM/automobile, reliability of transport technique, simulation modelling, application of computer technique)
- Module of traffic organization, production and repair of transport equipment (fundamentals of the production technology of transport technique, traffic organization and safety, repair of transport technique/certification and licensing on transport)
- Module Lifting transport vehicles, health processes (loading and unloading machines, fundamentals of manufacturing technology and restoration of transportation technique, transporting machines/ type and operation of technological equipment, lifting weight machines/information support in road transport, mechanization of loading and unloading, transport and storage works/ management of operability the transport technique)
- Module Digging, road and utility machines. Technological characteristics of the transport complex (working bodies and objects of impact, car service and corporate service, utility machines and automobile road maintenance/technological processes of maintenance and repair of cars, road machine, design of the enterprises of the motor transport, machines for earth works, resource saving during maintenance and repair of automobiles, technology of application of road building machines).

Students are required to take several internships: internship after the 1st year of studies, internship after the 2nd and 3rd academic year and pre-diploma internship during the 4th year.

Graduates find employment in all areas of industry, the economy, administration and the service industry. The degree programme prepares students for independent work in research, development and production.

## Evaluation

The curriculum sufficiently takes into account the qualification objectives. Since Kazakhstan's higher education system mandatory prescribes a certain number of basic general education subjects (history, foreign languages, physical education, etc.), a relatively long duration of study is appropriate. Special modules on specific topics within the educational process build upon each other. The last semester is balanced and consists of a practical phase, Bachelor's thesis and the state exam. The qualification objectives of the individual modules contribute to the development of the general qualifications of students in line with the objectives of the curriculum.

Student workload includes maximum seven modules per academic year. The optional modules are offered to a sufficient extent. Completion of studies is possible within the normative period of study. Teaching methods consist mainly of lectures, practical/laboratory classes, projects and work placements. Teaching methods and their variation in the curriculum meet the requirements of the programme objectives.

In particular, various practical phases in the 2nd, 4th, 6th and 8th semesters contribute to the development of graduates' professional skills. According to the documents submitted by the university, such as the programme description, curriculum and module guide, the structure of the programme in transport, transport engineering and technology seems to be suitable for achieving the qualification goals. Qualification objectives are generally achieved within the framework of didactic-pedagogical and substantive aspects of the curriculum.

The workload of the students is quite high with seven to eight modules in the first five semesters. The stated workload per semester is between 810 and 855 hours and additionally 30 or 150 hours for internships during the semester breaks and additional modules. Against the background of the high rate of graduates within the standard period of study, the course of study is considered to be studyable. The attendance and self-study times are distributed appropriately and the allocation of credits according to the student workload is considered plausible.

The forms of teaching 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 objectives. In particular, various practical phases contribute to orientation and preparation for the professional requirements of the graduates. Within the framework of academic mobility, students study abroad especially in Russia, which can, however, be further expanded.

The connection between the university and the industry and individual companies is very close and well established. This can be seen in the involvement of the companies in the design of the curriculum and involvement of the industry practitioners in teaching. In this way, labour market requirements are taken into account in the further development and design of the programmes.

The structure of the bachelor's programme according to the documents provided by the university, such as programme description, curriculum and module handbook, seems suitable for achieving the qualification goals. In the module handbook, the information on the examinations should be supplemented with regard to type, scope and duration. This recommendation applies to all study programmes undergoing the accreditation. The expert group does not properly understand the differences of the elective modules in the basic studies of the first four semesters. The programme basically reflects the qualification goals from both a content and didactic pedagogical point of view.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme “Transport, Transport Equipment and Technology” (Master)**

The purpose of the study programme is to train highly qualified specialists in the field of transport, transport equipment and technologies, possessing a high level of professional and moral qualities, capable of independent thinking and ensuring progressive scientific and technical development in the field of research, design, operation and repair of transport equipment.

The specific learning outcomes are described in the Diploma Supplement. Upon completion of the study programme, students will be able among others to

- develop the organization of work, evaluate the results of the transport complex units,
- carry out scientific and practical activities, using methods of the scientific knowledge
- conduct the research to improve ground transportation and technological complexes
- use application programs of design calculations of units and systems of equipment for maintenance, diagnosis and repair of ground vehicles
- develop and design technological documentation for the production of new and modernized samples of technological equipment etc.

Graduates of the Master's programme are qualified to pursue a doctoral degree.

The duration of scientific and pedagogical Master's degree is 2 years (125 credits) and 1.5 years in profile Master's programme (102 credits).

The curriculum includes basic mandatory and specialty disciplines, which can be mandatory as well as elective. The scope of basic disciplines is 44% in a 1.5-year programme and 48% in a 2-year programme and core disciplines 56% in a 1.5-year programme and 52% in a 2-year programme.

Specialty modules include Module Production and technical operation, Module Organization of Scientific Research, Module Transport Evaluation and Management and Module Operation of transport complexes. Practical phase consists of pedagogical practice (3 credits) and research practice (12 credits). The programme concludes with a Master thesis and defence and a comprehensive exam (44 credits).

During their studies, students take four modules in each academic year, including pedagogical practice, research practice and final certification.

### **Evaluation**

The structure of the Master's degree programme in accordance with the documents submitted by the university (description of the programme, syllabus and modules manual) seems to be suitable for achieving defined qualification objectives. Qualification objectives are generally achieved within the framework of didactic-pedagogical and substantive aspects of the curriculum.

The model curriculum takes sufficient account of the qualification objectives. The modules on specific topics during the learning process to a large extent built on each other. The last semester includes research practice, writing the final thesis and a comprehensive examination of the specialty. The qualification objectives of the individual modules in the module guide contribute to the general qualification of the students in accordance with the objectives of the curriculum.

Different Master's programmes aim at different qualifications to be achieved, 2 years: scientific-pedagogical training with the ability to pursue a doctorate degree, 1.5 years: career-oriented training for a higher activity in industrial companies, 1 year: further training for employees from industrial companies, thus meeting different requirements of science and economy. A transition between the Master programmes is possible.

The workload of the students is quite high with seven and six modules in the first two semesters, leaving little time for research work. This is then integrated more strongly into the course of study in the second year. The attendance and self-study times are distributed appropriately and the allocation of ECTS points according to the student workload is considered plausible. The programme can be studied within the standard period of study.

The forms of teaching essentially comprise lectures, exercises/seminars and practical courses which contribute to academic or professional work as well as pedagogical training. The types of teaching and their distribution in the curriculum correspond to the requirements of the educational objectives. Through international relations with other universities, a number of students have been able to spend time abroad for scientific purposes, but this can be further expanded.

### **Conclusion**

The criterion is **fulfilled**.

## **Description of facts study programme “Transport, transport equipment and technology” (PhD)**

The main aim of the PhD programme is to train highly qualified specialists in the field of transport, transport equipment and technologies, possessing a high level of professional and moral qualities, capable of independent thinking and ensuring progressive scientific and technical development in the field of research, design, operation and repair of transport equipment in the globalized world.

The PhD programme (259 credits) comprises of basic and core disciplines. Cycles of basic disciplines (17%) and profiling disciplines (83%) include disciplines of mandatory and optional component. Basic course module includes courses on fundamentals of scientific experiments, research transport operations and teaching practice. Further mandatory courses include strategic management, optimization of transport equipment service facilities, cost characteristics of transport technics and research practice. Elective courses are hydraulic impulse systems/transients modes of transport technics and mathematical models of the elements of the hydraulic/analytical and theoretical methods of research of the processes of work transport technics work.

Module Scientific Research Work is a main component of the programme and amounts to 200 credits. The final certification includes a comprehensive examination and registration and dissertation defence (20 credits).

Students acquire following competencies:

- professional competences - ability to perform tasks in accordance with the specified standards, to act successfully on the basis of practical experience, skills and knowledge in solving professional tasks;
- research competencies - the ability to solve tasks through heuristic approaches without using known algorithms, willingness to take an active research position in relation to their activities and themselves, as its subject, mastering the methods and logic of scientific research;
- communicative competences - the ability to social interaction with society and the collective, skills of working in a group, cooperation, tolerance; includes knowledge of languages, skills to conduct oral and written dialogue, monologue, business correspondence;
- competence of self-management - management of one's own resources, i.e. ability to acquire, preserve, develop and rationally use them, implies mastering the ways of self-development and self-regulation.

## **Evaluation**

The PhD programme is characterized by clearly defined national rules regarding the admission process, award of credits and the structure. The graduates are sufficiently prepared to conduct in-depth research work in their field or undertake a qualified position in an industry. Students receive

appropriate supervision from the local PhD advisors. Moreover, the expert group wants to accentuate that PhD students in all study programmes at the university are assigned an advisor from outside of Kazakhstan. Students have the opportunity to spend some time of their studies at the home university of the second advisor.

Furthermore, students are able to further develop their soft skills. PhD students are encouraged and supported by the university to take part in conferences and publish the results of their research projects.

For a long-term development of all programmes it would be beneficial to consider developing joint degree programmes with foreign universities.

## **Conclusion**

The criterion is **fulfilled**.

## **Description of facts Bachelor study programme „Logistics“ (Transport) (Bachelor)**

The modularized Bachelor's programme is offered in four various study durations:

- full-time – 4 years,
- shorten full-time – 3 years,
- shorten part-time – 3,5 years,
- part-time based on Higher Education – 2,5 years.

In order to graduate, students need to obtain 260 credits.

Currently, 144 students are enrolled in the program. The first students are expected to graduate in 2019.

Aim of the study programme is to train specialists with in-depth knowledge and skills necessary for the management of supply, warehousing and transport. The programme offers scientific and practical elements, professional knowledge and skills and prepares students for flexibility in employment and further education.

At the end of their studies, students will be able among other to

- develop and make management decisions in all functional areas of logistics
- use the special knowledge and skills in the management of logistics processes and projects
- optimize logistics processes in their responsibility field
- solve complex problems of transportation, warehousing and cargo handling
- plan, coordinate and control the work of warehouse services etc.

The curriculum includes not only programme-specific subjects but also mandatory subjects: social humanitarian subjects such as modern history and law of Kazakhstan (7%), Languages (English, Russian, Kazakh) (9%), physical education (5%), social-ethical subjects (3.5%). In addition, curriculum includes extensive practical module. The module consists of three phases, which have to be completed during the lecture-free time. During the practical phase, students gain practical experience in a company. After two semesters, they get to know the individual processes in a company. After the fourth and the sixth semester, students get a special training that enables them to practice as a craftsman for example as a motor mechanic, locksmith etc. During their eighth semester, students can take an internship in different departments of the company.

The Programme is rigorously designed so that it can be completed in a maximum of four years. There is no mobility window for a semester abroad. Studies abroad are only planned after the bachelor's degree.

The individual modules are of different sizes. The sub-modules have a size of 5 or 6 credits and thus have a similar workload.

### **Evaluation**

Graduates are qualified to develop and make management decisions in all functional areas of logistics. They can implement their knowledge and skills in the management of logistics processes and projects. They are able to optimise logistics processes in their responsibility field. They are able to solve complex problems of transportation, warehousing and cargo handling management, as well as information support of logistics and supply chain management.

The curriculum is adequate and enables to meet the set objectives. Qualification objectives are clearly defined.

The size of the sub-modules is appropriate. The student workload is appropriate.

### **Conclusion**

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.3: Student-centred learning, teaching and assessment****Standard: 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****Description of facts**

A variety of pedagogical methods are flexibly used and consist of innovative methods and tools, distance-learning (e-learning), active and classic and interactive methods of teaching (lectures, seminars, practical and laboratory exercises, virtual laboratory exercises, independent work of students under the guidance of a teacher followed by computer programs, business games, teamwork, analysis of specific situations, discussions, receipts/projects). All teaching materials are available in paper and electronic form. In order to develop e-learning further, a new system "Univer 2.0" was introduced in 2019, which is used for the provision of teaching materials and self-tests. In general, it would be desirable if students could carry out and present individually or in groups small research projects/experiments.

Students in the study programmes Transport and Materials Handling can work on different models in laboratories. There is also a whole range of planning algorithms on computers, which are only presented by the lecturers. Independent or guided work by students is only possible during the practical phases.

In addition, extracurricular work and practical training complement the study programme. Students have the opportunity to learn a profession (craftsmen) during their studies. The knowledge gained during the craftsmen training is enhanced throughout the course of study through internships. The university teachers lead the research groups. Students have an opportunity to participate in current research projects.

The proportion of self-study and contact time seems appropriate, and the contact time in practice hours with lecturers seems high in some cases. Module prerequisites are not listed, which is due to the approach of creating a fixed timetable structure for each learning group. Likewise, it is probably due to the hardly existing possibility of completing individual modules due to their fragmentation over the semesters before the start of other modules, with the exception of elements of the General Studies programme. The workload of the students appears to be quite high, which is recognizable from the total number of credits that the students have to earn in an atypically high way for the acquisition of the Bachelor's degree. Bachelor students are obliged to attend all teaching activities and the number of attendance hours is approximately 36-40 hours per week. The high study load, especially in the first and in the second semester, is intensified by 6-7 examinations at the end of each semester. Discussions with students showed that the workload, except for the first two semesters, is however adequate.

For full-time students, the academic year comprises of 36 weeks, of which six weeks are examination periods. The lecture period is split into two semesters (autumn and spring) of 15 weeks each.

Final state examinations take place before a specially appointed commission. The doctoral studies end with a complex state examination followed by the dissertation defence before a panel of experts.

Certain programme content and its implementation including learning and teaching methods is centrally determined by the Ministry of Education, which restricts the possibilities of teachers and students in terms of design of study programmes. Nevertheless, lecturers are endeavouring to make extensive use of new and innovative teaching methods, especially digital ones. However, the aim is to achieve a greater autonomy for higher education institutions. For example, the scope for the university to determine on its own the subjects to be taught in a study programme has recently increased from 60% to 80%, which will be used to further develop the study programmes. The development of the curriculum and syllabus mainly of elective subjects is carried out with the involvement of industry and students.

Theoretical studies are supplemented by practical phases, which as a rule have to be completed during the semester breaks between the spring and autumn semesters. In the Bachelor's programme, internships serve the professional qualification of the students, in the Master's programme, the scientific qualification and in part the pedagogical qualification, and in the doctoral programme primarily the pedagogical qualification as well as the practical research work.

The tests are module-related and take place during the three-week examination period at the end of the semester. Oral and written examinations are conducted as well as attestations. The number of examinations is quite high, six to seven examinations per semester, which is partly due to many 3-credit modules. The format of examination for each module is communicated to the students at the beginning of the semester. The mid-semester exams are held in the form of tests, colloquia, case studies, project work etc.

If a student failed an exam, he or she can repeat the exam twice free of charge. Failed examinations or other delays in the course of studies (e.g. due to illness, etc.) must be made up during the lecture-free period. An additional summer semester is offered for taking extra courses or repeating a course.

The grade for a discipline is cumulative: the final grade includes assessment of student performance during the semester as well as the final semester examination. In order to assess students' learning progress, different types of examinations are held in the subjects. First, the learning outcomes of the first 7 weeks are tested in the first test. In the 14th week, a further intermediate examination takes place. At the end of the semester final examination takes place, which is carried out in written form only. The intermediate examinations can be colloquia, seminar papers etc. The

teacher determines the type of examinations. The detailed information about the type of the examinations is communicated to the students at the beginning of semester. Performance is assessed on the basis of points. Each student can obtain a maximum of 100 points. The maximum number of points that students can obtain for an intermediate examinations is 60. Student needs to obtain at least 30 points to be admitted to the final examination. A maximum of 40 points is awarded in the final examination. The module grade depends on the total number of points and is calculated according to a grade code. However, it is not clear from the available documents whether and in what form research seminars, research internships and teaching placements are evaluated.

Students can view their exams and their results online at any time and thus obtain and maintain an overview of their examination results.

The examinations are organised in such a way that they enable a comprehensive competence-oriented assessment of the extent to which the students have achieved the learning outcomes. The content and type of the semester examinations are proposed by the participating teachers, reviewed and approved by the responsible academic examination committee of the faculty (similar to the examining board). Students are not represented in this committee. The expert group recommends that students should be represented in the examination committee. As a rule, in order to ensure transparency and objectivity, at least two independent lecturers assess written examinations.

Orientation Week is offered to all first-year Bachelor, Master and PhD students. Moreover, teachers are available for individual consultations and communication via e-mail.

Each student can decide if he or she wants to study one semester at the partner university in Kazakhstan or abroad. If there is no opportunity to study certain disciplines at the partner university, a student can take these disciplines via distance learning at the KSTU.

Students with limited abilities, for example students with impaired mobility, can study at the KSTU. The university infrastructure is under continuous improvement and takes into consideration the needs of students with disabilities and special educational needs. In 2017-2018, the specialized room has been located on the first floor of the university building, which is equipped in accordance to the needs of the students with disabilities.

Foreign students can apply to study at the KSTU. KSTU offers special measures to help foreign students adapt to the country.

The University constantly monitors the effectiveness of the educational services through systematic student surveys using various standardized questionnaires. Student satisfaction is assessed through an online questionnaire such as "Teacher through the eyes of students" before the examination to evaluate quality of the educational process in each academic term.

## Evaluation

Innovative teaching methods are widely used in the educational process. Sufficient measures are implemented to support students with disabilities and foreign students.

Master's and PhD students are restricted to thesis topics for which the university received a state funding. Expert group would encourage the university to consider the option of students choosing their research topic independently. During the visit to the university, Master's and PhD students have mentioned that they learn about new innovations related to their study programmes through internet. Perhaps the university could consider this fact and organize visits to exhibitions, conferences and other relevant events.

Learning methods include learning with modified tooling system, distance-learning (online-based teaching), active and interactive forms of class teaching (lectures, seminars, practical and laboratory classes, independent work of students under the guidance of a teacher computer programs, business games, teamwork, analysis of specific situations, discussions).

The detailed information about the forms of the current examinations and intermediate examinations is reflected in the curriculum of the discipline and is transparently communicated to the teachers and students at the beginning of the semester.

It would be desirable if the students could have more opportunity to work independently. There are many ways to promote the independence of students already in the Bachelor programme.

In the field of study organisation, the Bachelor and Master programmes in Mechanical Engineering are very well organised, as evidenced by a high degree of studyability and high graduation rates within the standard period of study. The creation of fixed timetable structures, which are then synchronously run through by seminar groups, continues to have a positive influence on studyability, but at the expense of the individuality of the study programme. The range of teaching and learning forms envisaged includes not only classical but also interactive formats and shows sufficient variance. The didactic means and methods used are consistently suitable for the qualification goals pursued in both degree programmes. The same applies to the forms of academic achievement. The possibilities for a more individual design of the course of studies within the framework of student mobility should, however, be improved, which would be possible by setting up a mobility window. In addition, the development of individual priorities and preferences outside the options listed seems to be virtually non-existent.

The modular structure of the Bachelor's and Master's degree programmes in Mechanical Engineering is consistent in itself and with regard to the implementation of the desired course objectives. The two programmes build well on each other and improve the qualifications of the students. This structure not only ensures the transfer of specialist and interdisciplinary knowledge,

but also provides specialist, methodological and, in some cases, pedagogical competences. Another positive aspect to be emphasised is the training of occupationally adequate manual skills through the internships to be completed. The competences to be achieved for each module are described in detail in the module handbook. The information on the student workload appears basically plausible and corresponds as far as possible to the qualification framework for the European Higher Education Area, which is confirmed by the good studyability.

The overall assessment of the examination system is good. The format of examination is specified in the module handbook for each module, but not the type, scope and duration of the examination. This should be concretized in all here to be accredited programmes. In addition, it could be checked to what extent quite high examination density can be reduced by alternative type of assessment.

Against the background of the high graduation rate within the standard period of study, the Bachelor and Master programmes are generally evaluated as good for studying. The slightly too high number of credits to be acquired in undergraduate and graduate degree programmes was adjusted to the normal level in subsequent curricula from 2019.

The doctoral programmes are more flexibly structured in terms of independent research-oriented work. In the doctoral programme, special courses are offered in the first semester, which allow expanding the specialist knowledge and skills acquired so far. These courses encourage independent study of new research methods and serve to promote research-oriented work. In the research internship, doctoral students learn independent research-oriented work, in which they can put their acquired specialist knowledge into practice. In the pedagogical internship, doctoral students can learn new teaching methods and acquire practical teaching skills.

No further special specifications are made in the course of the study, but only 200 credits are acquired for the individual scientific research work of the PhD students between 2<sup>nd</sup> and 6<sup>th</sup> semester. This is too high for a doctoral programme designed for three years and should be adjusted, which has already been done in the curriculum of 2019.

The independent research work on the dissertation project is supervised by a professor from the university and is accompanied by professors from other universities. Regular meetings are held to report on the status of the dissertation, to discuss open questions and to work out the next steps. This enables very intensive and individual support for each doctoral student.

Active participation in national and international scientific conferences is supported. This gives PhD students an opportunity to present their own research results to a specialist audience, discuss current issues with specialists and establish new scientific contacts. Doctoral candidates are obliged to publish their results.

Another positive aspect in this context is the internationalisation strategy of the university and cooperation with the universities in Europe, Asia and the USA. Corresponding learning agreements are concluded. The university should however further promote foreign language proficiency and international academic mobility of the students, so that more students take a semester abroad.

The examination system as a whole can be rated as good. Training of individual focal points and preferences outside the given options does not seem to be sufficiently provided. The studyability does not seem to be affected by this fact. The examination density is high in parts, but this does not seem to be a problem for students. There are possibilities to repeat examinations, but considering the university's internationalisation strategy, students taking mobility semester should be given an opportunity to repeat an examination in the same semester if they fail it.

The forms of examination are sufficiently defined in the relevant regulations and study documents. As a form of examination, a very large surplus of written examinations could be identified. The university should check whether oral examinations can also be used more intensively in later semesters in order to guarantee a competence-based examination mix. If corresponding to the learning outcomes, a wider variety of examination types should be used more. The number of written examinations should be reduced.

## **Conclusion**

The experts from the last accreditation recommended further strengthening of the student's ability to present and discuss verbally the topics from different fields of the courses and to place it in the context of the subject matter. Therefore, several presentations of projects and themes were implemented.

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.4: Student admission, progression, recognition and certification**

**Standard: 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.**

**Description of facts**

Admission policies and procedures are consistent with the university's mission, vision, strategic goals and are published on the university's website. Target groups are informed about study programmes through other channels such as brochures social media and articles in the newspapers. The admission rules are developed in accordance with the requirements of the Law of the Republic of Kazakhstan On Education; Decisions of the Government of the Republic of Kazakhstan On the approval of the Standard Rules for Admission to Education in the Organization of Education, Implementing Educational Programmes of Higher Education. The admissions committee of the university advises and answers questions on applying and admission to the KSTU, processes undergraduate and graduate applications and registers new students.

All information about academic achievements of the students is collected in the information system "Univer 2.0" and recorded by the Office of the Registrar.

KSTU has created opportunities for continuous promotion, personal growth, development and students' performance improvement. KSTU has an Institute of Professional Development, where students have an opportunity to receive additional educational services on a paid basis.

If the student has completed part or all of the studies at another university, he or she can apply to have these credits recognized for the studies at the KSTU. The same recognition method can be applied in case of a semester abroad.

University implements measures to ensure progress of the students and their smooth adaptation to the university environment. Students are regularly informed about their performance. The university encourages student-centered learning in the process of developing research and practical skills, by assigning to each student a scientific advisor and advisor for internships.

**Evaluation**

The admission requirements at the KSTU are clearly defined and published. Recognition rules are provided. The university regularly collects and monitors students' progression. Students are regularly informed about their progress.

KSTU applies the Regulation on the issuance of the Diploma Supplement, determines the procedure for drafting, content, development, improvement, issuance of the Diploma Supplement.

As a whole, the university carries out all the necessary measures for the provision of students with the support of documents confirming the level of the academic degree.

### Conclusion

The criterion is **fulfilled**.

### ESG Part 1, Standard 1.5: Teaching staff

**Standard: 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**

#### Description of facts

Human Resources Department of the university is responsible for ensuring sufficient personnel in the educational programs.

The total number of the teaching staff in the educational program 5B070900 - "Metallurgy" (Bachelor) is 49 people, out of which 36 teachers are regular staff. The number of students enrolled in this educational program is 287, i.e. the students–teacher ratio is 6:1. Some of the staff is also involved in the implementation of other educational programs, both in this specialization (i.e. Master's program 6M070900 - "Metallurgy", and doctoral PhD 6D070900 - "Metallurgy") and in other programmes. The educational program 6D070900 - "Metallurgy" consists of a staff that includes two doctors of science, five PhD, ten candidates of science, including one foreign teacher working under a contract.

Mainly full-time teachers carry out teaching at the KSTU. Moreover, seven teachers in the programs 5B070900 – "Metallurgy", 6M070900 – "Metallurgy", 6D070900 – "Metallurgy" were awarded "Best University Teacher of the Republic of Kazakhstan" and one person was the winner of the personal awards of the MES (Awards named after K. Satpayev, Ch. Valikhanov, Y. Altynsarin, Kultegin, D.A. Kunaev, M.O. Auezov). Several teachers in the faculty are holders of the State Scientific Scholarship for talented young scientists and the State Scientific Scholarship for scientists and specialists who have made outstanding contributions to the development of science and technology.

All teachers in the department undergo annually advanced training in order to improve their competencies, including at metallurgical enterprises. Young teachers, i.e. teachers with less than 5 years of work experience undergo a compulsory training at the KSTU Center for Engineering Pedagogy. The Center offers courses on the professional development of the teaching staff including courses on innovative educational technologies and best practices of modern engineering pedagogy.

The Department actively uses interactive learning methods. Moreover, every semester experienced teachers hold open classes and master classes and demonstrate interactive teaching methods.

Teaching staff is actively engaged in scientific research. The majority of teaching staff participates in national and international conferences. They are involved in the implementation of state budget funded projects through the Program of Grant and Program-Targeted Funding from the Committee of Science of the Ministry of Education and Science, JSC "Science Foundation", and contractual topics. Staff publishes the results of their research in various scientific publications and reports at various international conferences. The research work and its results is implemented by the faculty in the study programmes, mostly in the elective courses, preparation of coursework and thesis, writing textbooks and other educational and methodical works.

Lectures in the programmes "Metallurgy" are also hold by teachers from abroad, for examples from the University of Lorraine, Nancy, France, Rose-Hulman Technical University (USA), Irkutsk National Research Technical University (Russia), Zaporizhzhya state engineering academy (Ukraine).

Study programmes "Logistics (Transport)" and "Transport Equipment and Logistics Systems" are based in the department of transport and logistics. The department staff consists of six PhD of whom two are professors, twelve candidates of science of whom eight are lecturers and 15 teachers with Master's degree. The percentage of part-time teachers is 22%, including teachers-practitioners from industries, as well as employees of Corporate University enterprises-members. For the 2017-2018 academic year, the total number of faculty members is 39 people, including 32 full-time teachers. The faculty is formed on the basis of the requirements for effective implementation of educational programmes of bachelor's, master's and doctoral degree, as well as on the basis of the total volume of educational burden per one full-time teacher and cohort of students.

A number of teachers have an opportunity to participate in various external academic mobility programmes. Usually these take place in Kazakhstan or in Russia.

The professional development of teachers is carried out through courses, seminars, individual internship and trainings. Professional development programmes take into account current trends in the development of education and research, promote innovative teaching methods and their introduction into the educational process.

University's Department of Administrative Development (DAD) together with heads of structural divisions is responsible for all personnel processes.

Selection for vacant positions of the teaching staff is carried out on a competitive basis in accordance with the "Rules for the competitive replacement of the posts of the teaching staff and scientific workers of universities" and based on the results of a secret ballot of the competitive com-

mission. The announcement of the vacant positions is published in periodicals distributed throughout the Republic of Kazakhstan. Bachelor and Master programmes teachers must fulfil different requirements. A teacher in Bachelor programmes must have a university degree and at least ten years' of teaching experience at a university. A teacher in Master's programme must hold a doctorate degree. Lecturers conclude an individual contract with the university, which is, however, always a fixed-term contract.

Taking into consideration the self-report and the information provided during the visit of the university, the Bachelor's degree programme "Standardisation and Certification and Mechanical Engineering" has sufficient number lecturers with adequate training. It should be noted that the same lecturers also supervise the Master's degree programmes "Standardisation and Certification" and "Mechanical Engineering". There is currently a decline in the number of graduates, which can be attributed to a demographic slump in the early 1990s. In perspective, the faculty expects about 120-180 first-year students per year in relation to Bachelor's and Master's students. The personnel resources of the chair appear to be sufficient for the implementation of the above-mentioned study programmes.

The number of teachers in relation to the number of students at the faculty can be regarded as good. However, the teaching load of the lecturers involved in the study programmes leaves little time for research. The total workload of the teachers amounts to 750-650 hours per academic year and corresponds to approx. 25 Kazakh credit points. The total load consists of courses (60 percent), consultation hours, subject-specific supervision of the students, examinations, educational work with the students as well as research. On average, a professor offers seven to eight courses per academic year and takes three to five examinations per semester. An academic lecturer usually supervises no more than eight final theses at once.

Quality assurance measures are implemented such as teacher evaluations. If the results of the evaluations are poor, the university might consider not extending the contract. If the results are especially good, the university offers monetary rewards, prizes etc.

With regard to equal opportunities and gender equality in personnel, the overall situation at the university is positive. Based on the historical development of the country, equal opportunities and gender equality is established and implemented. Teaching staff are of various nationalities and the proportion of women in the teaching staff is high.

## **Evaluation**

In general, the Human Resources of the University are suitable for the implementation of the study programmes. The teachers have the necessary qualifications. Attracting Leading Scientists, Employees of the Enterprises of the Research and Production Consortium "Corporate University", as well as foreign lecturers in the University for lectures provide a high-quality level of training. The

University offers various measures to develop and improve the skills of teaching staff. However, further education takes place mainly in Russian speaking countries. For further development of study programmes, the group of experts recommends promoting foreign language proficiency as well as international mobility of teachers, which will not only develop their qualifications further, but also give them an opportunity to actively participate in scientific developments on the international level.

Moreover, the university should provide teachers with more incentives for conducting research. In particular, measures such as decreasing teaching workload, providing more financial resources and attracting foreign researchers could be considered.

In general, the personnel resources for the implementation of all the study programmes reviewed here for the above-mentioned degrees appear structurally sufficient at the time of the review to implement the respective study programme concepts consistently and purposefully. At the same time, they guarantee a good advisory culture by the participating faculty. It is evident that the personnel resources are large enough to ensure a good supervision ratio in addition to an extensive range of courses.

Personnel development and qualification measures are in place; they are also well used as motivation is encouraged and the framework conditions are in place.

## **Conclusion**

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.6: Learning resources and student support**

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

**Description of facts**

Financial resources of the KSTU include funding from the state budget consisting of educational grants and tuition fees. The university receives additional funding through state-funded scientific projects, as part of a Ministry of education and science of Kazakhstan or JSC "Science Foundation" grant funding, as well as in the framework of economic agreements. This funding provides financial resources for research activities and supports students, as some of them are involved in the implementation of research projects.

The department Transport Equipment and Logistics Systems houses the programmes "Transport, transport equipment and technology" (Bachelor, Master, PhD) and "Logistics" (Bachelor). The department's infrastructure includes lecture halls, several classrooms including several auditoriums equipped with a multimedia projectors and board and three computer classrooms. Further auditoriums have models of rear axle, crankshaft, brake drum, fuel-dispensing unit in section, starter in section, cardan shaft, etc. Six laboratories are equipped with a crawler tractor slipping test bench, hydraulic cylinders test bench, fuel equipment test bench, auditorium equipped with the equipment for electrolytic expansion of parts, lathe model etc. Another auditorium is equipped with a stone material-cutting machine, a model of a building materials plant and a rotary drilling rig. The students and the teachers can use the material base of the local leading enterprises. The agreements between the enterprises and the university are concluded.

All laboratories of the departments are certified and have necessary fire safety measures. Students and the staff on a regular basis have to take laboratory safety trainings.

All practice bases provide students with the opportunity to pass it at their workplaces as locksmiths to repair transport equipment, road workers, assistant mechanics, doublers.

The study programmes "Metallurgy" have a sufficient number of lecture halls, laboratories, computer classes and offices with a modern equipment. Some of the classrooms are equipped with stationary video projectors or interactive whiteboards. The university has comfortable dormitories, sports facilities, medical center, etc.

The University has a large library, which has study spaces equipped with computers with Internet access. The library resources include a sufficient number of educational materials and electronic resources for training in programs "Metallurgy". However, according to the feedback of students, the literature is mainly in Russian language and there is not enough specialized literature in state

and in foreign languages. The University has a subscription to databases such as Springer, Elsevier and others, but this is not sufficient for PhD students who need a modern foreign scientific literature in the field of metallurgy.

In 2018, the chair of Metallurgy completed restructuring and modernizing its educational and scientific laboratories and laboratory equipment, which currently partially meets modern scientific and technical level. The equipment in the laboratories and practice areas is fit for purpose with all necessary safety standards. In addition, students and teachers can use laboratories and production equipment in several research institutes (for example Chemical and metallurgical Institute named after Abishev or the Institute for integrated subsoil development) or at industrial enterprises.

Students enrolled in educational programs 6M070900 - "Metallurgy" and 6D070900 - "Metallurgy" (i.e. graduates and doctoral students) can use the research and technological equipment of the laboratory of engineering profile and laboratories of the Center of Heat-resistant Materials. PhD students have an opportunity to conduct research in a foreign partner university, where their second foreign supervisor is located.

The university maintains close contacts with national and international companies, research institutes, which provide practical training opportunities and foreign universities, which provide students with the opportunity to study abroad.

The interactive training classes of the department of Nanotechnologies and Metallurgy include appropriate computer and IT equipment. Necessary software licences are available. The computer class of the *Department of Specialized Training* is equipped with access to the Internet and works under the group policy ActiveDirectory at the Research Institute of Electronic Educational Technologies. A modern experimental base was established at the department, containing various equipment and test benches for research, equipped with modern software and hardware systems, tools have been developed for modelling the processes of shaping materials and products. Within the framework of cooperation agreements, students in higher semesters have access to laboratories in companies and research institutions.

The department "Technological Equipment, Mechanical Engineering and Standardisation" responsible for the study programme "Mechanical Engineering" (Bachelor/Master/PhD) and "Standardization and Certification" (Bachelor/Master) is equipped with the following laboratories and specialist cabinets

- Laboratory "Mechanical processing" with 33 places,
- Laboratory "Machine tools and cutting tools" with 24 seats,
- Laboratory "Automation of production processes" with 24 places,
- Laboratory "Standardization and Metrology" with 20 places,

- 2 computer rooms with 28 and 32 seats

as well as four lecture halls with seating capacity between 22 to 52 seats and one seminar room with 20 seats capacity. The classrooms are equipped with modern computer and projection technology as well as classical and white boards. The laboratory equipment includes various tool machines for turning, milling, drilling and grinding, two presses, several industrial robots, equipment for surface coating, storage technology for raw materials as well as various measuring instruments and measuring technology (e.g. vibration measuring instrument, profile measuring instrument, laser length measuring instrument, optimeter, etc.). The acquisition periods range from 1953 to 2012. Teachers receive regular briefing on occupational safety in the laboratories.

The laboratories and specialist cabinets are used for practical and interactive training of students in the various study programmes. In addition, the equipment and facilities of the leading mechanical engineering companies in the region are available to the students during the internships. Students are supported in their search for national and international internships by a department staff that have close contacts to national and international companies, research institutions and universities.

In addition, everyone can directly address his or her issues with the rector of the university through "Blog of the Rector". All addressed questions and issues are published and therefore available to the public.

Each student group is assigned an academic advisor and a curator. The curator provides support to students in matters related to learning, such as planning an individual curriculum, especially in choosing elective subjects. The curator is a direct contact person for a group of students throughout the period of study. The curator helps them in the organization of their study and supports in solving housing or social problems. The work of curators is coordinated by the Faculty Council of Curators, which carries out its activities in accordance with the regulations of the Council of Curators of KSTU. The Council coordinates methodological work of curators in order to improve their work, analyses curators' educational work plans for the current year, monitors the implementation of long-term plans, coordinates their tasks and organizes the exchange of experience.

Regulations on gender equality and equal opportunities for students, especially for students with children, foreign students, students with health problems and students with disabilities is regulated by the legislation of higher education of the Republic of Kazakhstan. These requirements are strictly enforced in the university. For example, for students with disabilities the university offers for example alternative exam forms, extra time to submit assignments etc. In case of prolonged illness, pregnancy and birth of a child, the possibility of academic leave is available.

Various counseling services are available. Central service offices assist students in their general questions on studying at the university. Programme specific and curriculum related questions can

be addressed to faculty members for example to a student group advisor. They consult students on curriculum plans and help with study specific issues.

The University Center of International Cooperation and Academic Mobility assists in all matters regarding mobility. The staff consults both incoming and outgoing students. Moreover, it builds partnerships with national and international institutions.

The university has a psychological support service for students - a crisis center including a direct helpline. The university has several canteens seating 150 people. Medical care of employees and students is provided by a medical center, which is located in the student dormitory. Dental and physiotherapy services are accessible to the students on campus.

### **Evaluation**

Financial resources, material and technical base and infrastructure at the KSTU is sufficient to meet the objectives of the study programmes. Sufficient classrooms and specialized laboratories are available, equipped with machines, equipment and computers as well as access to the Internet. However, some of the laboratory equipment is outdated. Therefore, within the financial capabilities of the university, it is necessary to continue the modernization of material resources to fully meet the modern scientific and technical level. This is especially necessary for the doctoral programmes.

The university should ensure that internationally applicable safety standards for laboratory work in the study programmes "Metallurgy" are observed. The international standards of occupational safety and laboratory organization that go beyond national standards should be fully established in these study programmes as far as possible.

The library is fully equipped, and its opening hours are convenient, but it would be desirable to equip the library with up-to-date literature in the state and foreign languages and provide broader access to the international academic journals.

Organization of the educational process and supervision of students at the KSTU is well organized and transparent.

### **Conclusion**

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.7: Information management****Standard: Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes and other activities.****Description of facts**

The main goal of information management at the KSTU is to increase competitiveness of the university and to develop market relations. It provides population with current information about the university, raises awareness about the university, promotes new disciplines and education offers at the university, brand promoting and represents interests of the KSTU in the governmental and administrative bodies. Data is collected and analysed by the information management unit. It is part of the Quality Management and Quality Assurance system based on ISO 9001:2015 and governmental regulations. Within the quality assurance, different evaluations are conducted and used for further development of the study programmes.

A registrar office analyses and evaluates students' academic performance. Additional mechanisms are used to assess educational programmes (e.g. performance monitoring, midterm certification), internal monitoring and internal audits. The data is used in accordance with the law of Kazakhstan. Activities of the research projects are published on the university website.

**Evaluation**

Deans, heads of departments and divisions are largely responsible for the organization of the quality management tasks. Their responsibilities include evaluation monitoring. KSTU regularly collects data and information on study programmes, students, graduates and other indicators within the internal quality assurance system. The results of the evaluations and surveys are systematically reviewed and considered in further development of study programmes.

Students and staff of the KSTU participate in the quality management processes. In addition, graduates, employers and other relevant stakeholders are involved in this process.

**Conclusion**

In the last accreditation, it was recommended to evaluate the workload of the students and make it more transparent. Necessary measures were implemented and workload evaluation is now part of the course evaluation. The results of the evaluations are communicated and discussed with the students.

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.8: Public information****Standard: Institutions should publish information about their activities, including programmes, which is clear, accurate, objective, up-to date and readily accessible.****Description of facts**

The university has a wide range of information materials and communication channels. This includes, for example, brochures in printed and digital form, a website in several languages. The homepage is available in Kazakh, Russian and English. However, not all sites are translated in all languages. The website is clearly structured and up-to-date.

A central mean for sharing information is the university website. 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 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.). The KSTU publishes information about educational and research activities and events on popular social networks.

**Evaluation**

Comprehensive information is available for the public. Especially the website is the main communication channel to inform the public. The only shortcoming is that not all pages of the website are available in English. Therefore, it would be beneficial to have all pages translated, so that the information is also available to international students who do not speak Kazakh or Russian.

**Conclusion**

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.9: On-going monitoring and periodic review of programmes**

**Standard: 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.**

**Description of facts**

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

A survey on student satisfaction with the quality of the educational 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 in general students are satisfied with the quality of the programs. 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 KSTU graduates.

**Evaluation**

Sufficient instruments for monitoring and periodic review of the programmes are implemented at the KSTU. The monitoring process includes analysis of the needs of relevant stakeholders such as students, society, industry, state etc.. The results of the surveys are reflected and communicated adequately. Students are represented in several committees. The expert group recommends to actively involve students in the process of monitoring and reviewing programmes.

**Conclusion**

In the last accreditation it was recommended to make all regulations and rules more transparent to the students. Since the last accreditation, the regulations and rules are more transparent and students are informed about them.

The criterion is **fulfilled**.

**ESG Part 1, Standard 1.10: Cyclical external quality assurance****Standard: Institutions should undergo external quality assurance in line with the ESG on a cyclical basis****Description of facts**

KSTU conducts external quality assurance procedures in accordance with the State General Education Standard and European Standards and Recommendations (ESG) on a regular basis. 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. Also, in 2018 the university received institutional accreditation.

**Evaluation**

KSTU regularly undergoes external quality assurance in line with the ESG.

**Conclusion**

The criterion is **fulfilled**.

### **3. Assessment of the implementation "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (ESG) as amended.**

The study courses „Standardization and Certification“ (Bachelor /Master), „Mechanical Engineering“ (Bachelor/Master/PhD), „Metallurgy“ (Bachelor /Master/PhD), „Materials science and technology of new materials“ (Bachelor/Master), „Transport, transport equipment and technology“ (Bachelor/Master/PhD), „Logistic“ (Transport) (Bachelor) were assessed on the basis of the "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (ESG).

The group of evaluators concludes that 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 (Ongoing monitoring and periodic review of programmes) and 1.10 (Cyclical external quality assurance) are fulfilled.

**Standard 1.1 Policy for quality assurance:** Universities have a publicly accessible quality assurance strategy, which is part of their strategic management. This strategy is developed and implemented by internal stakeholder representatives through appropriate structures and processes, involving external stakeholders.

The criterion is **fulfilled**.

**Standard 1.2 Design and approval of programmes:** Universities have procedures for the design and approval of their courses. The courses are designed in such a way that their objectives, including the desired learning outcomes, can be achieved. The qualification obtained during a degree program is clearly defined and communicated; it refers to the corresponding level of the national qualifications framework for higher education and, consequently, the qualifications framework for the European Higher Education Area.

The criterion is **fulfilled**.

**Standard 1.3 Student-centred learning, teaching and assessment:** Universities ensure that the courses offered are carried out in such a way as to encourage students to play an active role in the design of the learning process and that this approach is also taken into account when assessing students / examinations.

The criterion is **fulfilled**.

**Standard 1.4 Student admission, progression, recognition and certification:** Universities ensure that the courses offered are carried out in such a way as to encourage students to play an active role in the design of the learning process and that this approach is also taken into account when assessing students / examinations.

The criterion is **fulfilled**.

**Standard 1.5 Teaching staff:** Universities ensure the competence of their teachers. They use fair and transparent procedures for the recruitment and further training of their employees.

The criterion is **fulfilled**.

**Standard 1.6 Learning resources and student support:** The university has adequate funding to finance study and teaching and ensure that there is always a sufficient and readily available range of learning and support available for their studies.

The criterion is **fulfilled**.

**Standard 1.7 Information management:** Universities ensure that they collect, analyze and use the relevant data relevant to the successful conduct of studies and other activities.

The criterion is **fulfilled**.

**Standard 1.8 Public information:** Universities publish easily understandable, correct, objective, up-to-date and well-accessible information about their activities and courses of study.

The criterion is **fulfilled**.

**Standard 1.9 On-going monitoring and periodic review of programmes:** Universities are constantly monitoring their courses and regularly reviewing them to ensure that they achieve the goals set and meet the needs of students and society. The tests lead to a continuous improvement of the courses. All affected parties will be informed about any measures planned or resulting from this.

The criterion is **fulfilled**.

**Standard 1.10 Cyclical external quality assurance:** Universities regularly undergo external quality assurance procedures in accordance with the ESG.

The criterion is **fulfilled**.

The evaluators note that the recommendations from the first accreditation procedure have been adequately taken into account.

#### **4. Accreditation proposal**

The expert group recommends accreditation of the „Mechanical Engineering“ (Bachelor / Master / PhD) „Standardization and Certification“ (Bachelor / Master) „Metallurgy“ (Bachelor / Master / PhD) „Materials Science and Technology of New Materials“ (Bachelor / Master) „Transport, Transport Equipment and Technology“ (Bachelor / Master / PhD) „Logistics“ (Transport) (Bachelor) without conditions / requirements.

## **IV. Decision / Decisions of the Accreditation Commission of ACQUIN**

### **1. Accreditation decision**

Based on the evaluation report of the expert group, the statement of the HEI and the statement of the Standing Expert committee, on 24th March 2020 the Accreditation Commission made the following decision:

**The study programmes are accredited without general and specific conditions.**

The following general recommendations are given for the further development of the study programmes:

- The types of examination should be varied in correspondence to learning outcomes. The number of written examinations should be reduced.
- Individual module descriptions should include information on type, scope and duration of the examinations.
- The content of the modules in the module handbook should be described more precisely.
- The university should promote foreign language proficiency and academic mobility of the teachers and students.
- The university should provide teachers with more incentives for conducting research.
- Students should be represented in the examination committee.
- Within the scope of the financial possibilities, the university should continuously modernize its technical equipment, such as machines and systems.

**The study programme „Standardization and Certification“ (Bachelor of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Standardization and Certification“ (Master of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Mechanical Engineering“ (Bachelor of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

The following recommendations are given for the further development of the study programme:

- The student workload in the first four semesters should be distributed more evenly.
- The elective modules should be checked for content overlaps.

**The study programme „Mechanical Engineering“ (Master of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Mechanical Engineering“ (Ph.D) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Metallurgy“ (Bachelor of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

The following recommendations are given for the further development of the study programme:

- The university should ensure that internationally applicable safety standards for laboratory work are observed. The international standards of occupational safety and laboratory organization that go beyond national standards should be fully implemented as far as possible.
- The proportion of practical exercises should be increased.

**The study programme „Metallurgy“ (Master of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

The following recommendations are given for the further development of the study programme:

- The university should ensure that internationally applicable safety standards for laboratory work are observed. The international standards of occupational safety and laboratory organization that go beyond national standards should be fully implemented as far as possible.
- The master's degree students should get more practice in research.

**The study programme „ Metallurgy“ (PhD) 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 ensure that internationally applicable safety standards for laboratory work are observed. The international standards of occupational safety and laboratory organization that go beyond national standards should be fully implemented as far as possible.

**The study programme „Materials Science and Technology of New Materials“ (Bachelor of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

The following recommendations are given for the further development of the study programme:

- The area “Technology of New Materials” should gain greater attention in the goals and contents of the programmes.
- The university should develop a concept to counter the decline in the number of students.

**The study programme „Materials Science and Technology of New Materials“ (Master of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

The following recommendations are given for the further development of the study programme:

- The area “Technology of New Materials” should gain greater attention in the goals and contents of the programmes.
- The university should develop a concept to counter the decline in the number of students.

**The study programme „Transport, Transport Equipment and Technology“ (Bachelor of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Transport, Transport Equipment and Technology“ (Master of Engineering and Technology) is accredited without any conditions.**

**The accreditation is valid until 30 September 2027.**

**The study programme „Transport, Transport Equipment and Technology“ (PhD) is accredited without any conditions.**

**The accreditation is valid until 30 September 2028.**

**The study programme „Logistics (Transport)“ (Bachelor of Services) is accredited without any conditions.**

**The accreditation is valid until 30 September 2028.**