KAZAKHSTAN ASSOCIATION FOR MODERN (ELITE) EDUCATION KAZSEE

APPROVED
Accreditation Council
KAZSEE
18 June 2021

STANDARDS

FOR SPECIALIZED EDUCATIONAL PROGRAMS ACCREDITATION OF HIGHER EDUCATION INSTITUTIONS

Almaty, 2021

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FOREWORD

These standards of educational programs were developed by the Kazakhstan Association for Modern (Elite) Education KAZSEE in order to ensure high quality training of specialists with higher professional education. Therefore, compliance with standards should guarantee quality and contribute to the continuous improvement of educational programs of higher education institutions.

KAZSEE standards are in line with the Bologna Declaration and distinguish between first and second cycle programs. The term "cycle" is used to define an educational program leading to the award of an academic degree. The first cycle includes bachelor's degree programs, and the second cycle provides master's degree programs.

In Kazakhstan, the Tempus QUEECA Project was implemented in 1995 to create and introduce a quality assurance system for engineering education in Central Asian countries, and resulted in the establishment of national agencies, including the KAZSEE agency for quality assurance of educational programs and the ENAEE authorized to award the EUR-ACE Label.

In 2015, KAZSEE became a member of ENAEE and FEANI, allowing Kazakhstan to integrate a quality assurance system into the European Union. This will enable graduates of domestic universities to receive diplomas with international recognition and freely find employment in the countries of the European Union. Such a transparent system for the recognizing of qualifications is the first step towards creating a common market for labor resources and services.

The accreditation agencies that are members of ENAEE mutually recognize the equivalence of programs bearing the EUR-ACE Label and guarantee that their quality meets the European standard. Currently, ENAEE includes such accreditation agencies as Engineers Ireland (Ireland), ECUK (Great Britain), ASIIN (Germany), Ordem dos Engenheiros (Portugal), CTI (France), AEER (Russia) and KAZSEE (Kazakhstan).

At present, it is impossible to imagine the passage of accreditation without the participation of the professional community. So, in particular, the founders of KAZSEE are the Association of Legal Entities "Kazakhstan National Monitoring Committee IGIP" Association, the Institution "National Academy of Sciences of the Higher School of Kazakhstan", which allows taking into account the views of all interested parties in the procedure for guaranteeing the quality of educational programs.

KAZSEE is recognized by the Ministry of Education and Science of the Republic of Kazakhstan as an accreditation body, and by Order of the Minister dated September 27, 2017 No. 482, it is included in the National Register No. 1 of the Ministry of Education and Science of the Republic of Kazakhstan for a period of five years.

The KAZSEE standards and accreditation procedure are developed taking into account the world experience in assessing the quality of education and meeting the requirements for the quality of training by the accreditation systems of the countries participating in the Washington Agreement, the European Association for Quality Assurance in Higher Education ENQA[1], the European Network for Accreditation of Engineering Education ENAEE[2] and the International Network for Quality Assurance Agencies in Higher Education INQAAHE[3].

KAZSEE standards are focused on evaluating the achievement of planned learning outcomes. Learning outcomes are a set of competencies, knowledge, abilities, skills,

[1] ENQA (European Association for Quality Assurance in Higher Education), «Standards and Guidelines for Quality Assurance in the European Higher Education Area»: http://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf

[2] ENAEE (European Network for Accreditation of Engineering Education) – organization coordinating the functioning of the pan-European accreditation system for engineering education, created with the support of the European Commission; has the right to assign the EUR-ACE mark ®: http://www.enaee.eu.

[3] INQAAHE (International Network for Quality Assurance Agencies in Higher Education), “INQAAHE Guidelines for a Good Practice” 2016 revised edition//http://www.inqaahe.org/sites/default/files/INQAAHE_GGP2016.pdf

methodological culture acquired by students at the end of the educational program. They are developed based on the requirements of the professional community for graduates, and are coordinated with the "Dublin Descriptors"[4], set within the framework of the creation of a common European higher education area during the implementation of the Bologna Process.

A prerequisite for accreditation of the program is confirmation of the achievement of the planned learning outcomes by all students completing their studies under the program, and the readiness of graduates for professional activities following the program's objectives.

Learning outcomes are planned based on the objectives of the educational program and must comply with the KAZSEE requirements presented in this document. The objectives of the educational program are formulated by the unit/university implementing the program, should be consistent with the academic standards of higher professional education of the Republic of Kazakhstan and the university's mission.

Educational programs licensed by the Committee for Control in the Field of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan are accepted for accreditation.

An educational program can be accredited only if it meets all of the criteria listed below.

[4] The Dublin Descriptors describe the general requirements for the first, second, and third cycle graduates: http://www.jointquality.org.

"ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІНІҢ БІЛІМ ЖӘНЕ ҒЫЛЫМ САЛАСЫНДАҒЫ БАҚЫЛАУ КОМИТЕТІ" РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК МЕКЕМЕСІ

РЕСПУБЛИКАНСКОЕ ГОСУДАРСТВЕННОЕ УЧРЕЖДЕНИЕ "КОМИТЕТ ПО КОНТРОЛЮ В СФЕРЕ ОБРАЗОВАНИЯ И НАУКИ МИНИСТЕРСТВА ОБРАЗОВАНИЯ И НАУКИ РЕСПУБЛИКИ КАЗАХСТАН"

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28.09.2017жс. № 17-8/1205

Казахстанская Ассоциация инженерного образования KAZSEE

Комитет по контролю в сфере образования и науки по итогам заседания Республиканского аккредитационного совета (далее – Совет), сообщает следующее.

Для рассмотрения документов аккредитационных органов 21 сентября 2017 года проведено заседание Совета.

Советом принято решение о признании аккредитационным органом и включении в Реестр признанных аккредитационных органов (Реестр – 1) сроком на пять лет Казахстанской Ассоциации инженерного образования (KAZSEE).

На основании решения Совета издан приказ Министра образования и науки Республики Казахстан от 27 сентября 2017 года № 482 о признании аккредитационным органом и включении в Реестр 1 сроком на пять лет Казахстанской Ассоциации инженерного образования (KAZSEE).

Реестр 1 с включением признанных аккредитационных органов будет размещен на интернет-ресурсе Министерства образования и науки Республики Казахстан.

Кроме того, информация о признанных и включенных в Реестр 1 аккредитационных органах имеется на интернет-ресурсе Комитета по контролю в сфере образования и науки Министерства – control.edu.gov.kz.

Председатель **А. Примкулов**

Д. Кудикенова,
742374

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KazSEE
Kazakhstan Society for Engineering Education

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To 27 September 2022

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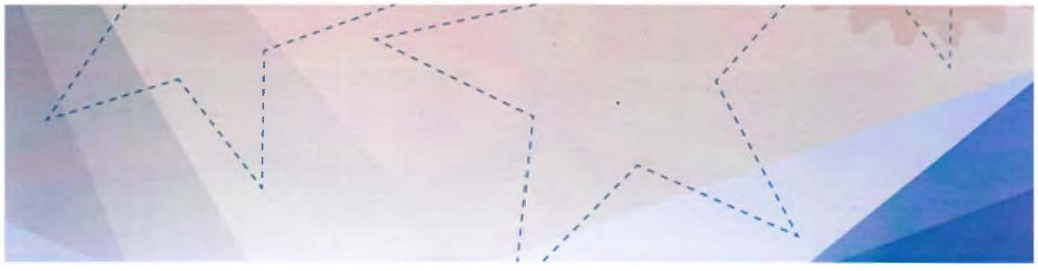
Brussels, 20 November 2017



STANDARDS FOR SPECIALIZED ACCREDITATION OF EDUCATIONAL PROGRAMS OF HIGHER EDUCATION INSTITUTIONS

1. Application area

1.1 The present standards are developed in accordance with the "Law on Education" of the Republic of Kazakhstan and on the basis of the Standards and guidelines for quality assurance in the European Higher Education Area (ESG). When compiling these standards, the authors took into account the standards of the existing accreditation agencies.

1.2 The present standards are used as a quality assurance tool for the specialized accreditation procedure of educational programs of a higher education institution.

1.3 The provisions of the present standards can be used by higher education institutions and are mandatory for them when passing the specialized accreditation regardless of their status, organizational and legal forms, forms of educational training and departmental subordination.

1.4 The present standards are applied by universities to conduct specialized self-evaluation of educational programs, define and improve internal mechanisms of quality assurance, development of internal documentation and development of corporate culture.

2. Normative references

References to the following legislative normative documents are used in these standards:

2.1 The State Program of Education Development in the Republic of Kazakhstan for 2011 – 2020. The Decree of the President of the Republic of Kazakhstan dated December 7, 2010. No 1118.

2.2 Strategy “Kazakhstan-2050”: new political course of the established state. Address by the President of the Republic of Kazakhstan, Leader of the Nation, N.Nazarbayev to the people of Kazakhstan dated December 14, 2012.

2.3 The Strategy for development of the Republic of Kazakhstan until the year 2020 approved by the Decree of the President of the Republic of Kazakhstan dated February 1, 2010 No. 922.

2.4 The Law of the Republic of Kazakhstan on Technical Regulation dated 9 November, 2004 No. 603-II ZRK.

2.5 The Law of the Republic of Kazakhstan on Education dated June 27, 2007 No. 319-III.

2.6 The Law of the Republic of Kazakhstan on Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on Expanding the Academic and Administrative Independence of Higher Education Institutions dated July 4, 2018 No. 171-VI.

2.7 The Law of the Republic of Kazakhstan About Accreditation in the field of Assessment of Conformity dated July 5, 2008 No. 61-IV ZRK.

2.8 State Compulsory Education Standard of the Republic of Kazakhstan “Higher Education. Bachelor's degree. Basic provisions ", approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 13.05.2016. No. 292

2.9 State Compulsory Education Standard of the Republic of Kazakhstan "Postgraduate Education. Master's Degree. Main provisions", approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 13.05.2016 № 292.

2.10 State Compulsory Education Standard of the Republic of Kazakhstan "Postgraduate Education. Doctoral studies. General provisions", approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 13.05.2016 № 292.

2.11 Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) (Approved at the Yerevan Conference of Ministers of Education, May 14-15, 2015).

2.12 Guidelines on the Use of ECTS (European Credit Transfer and Accumulation System). - European Union Publications Office, 2015, ISBN 978-92 -79-43562-1 (Approved at the Yerevan Conference of Ministers of Education on May 14-15, 2015).

2.13 National Qualifications Framework.

3. Terms and definitions

The following definitions are used in the present standards:

3.1 Accreditation of an educational organization is the procedure of recognition by an accreditation body of the compliance of educational services with the established accreditation standards (regulations) in order to provide objective information on their quality and confirm the existence of effective mechanisms to improve it.

3.2 Accreditation body is a legal entity that carries out institutional and (or) specialized accreditation of educational organizations on the basis of standards developed by it.

3.3 Specialized accreditation is the assessment of the quality of individual educational programs implemented by an educational organization.

3.4 Distance learning technologies (hereinafter – DLT) are learning technologies implemented with the use of information and telecommunication means in an intermediated (at a distance) or not fully intermediated interaction between a student and a teacher.

3.5 Informational resources are a set of library collections, electronic learning materials and other electronic educational resources, electronic catalogs, databases of electronic scientific resources, etc.

3.6 Final attestation of students is a procedure carried out in order to determine the degree of their mastery of the volume of academic subjects, academic disciplines and (or) modules required by the state compulsory standard of the relevant level of education.

3.7 Credit technology of education is education based on the choice and independent planning of the student sequence of courses with the accumulation of academic credits.

3.8 Quality of education is compliance of the level of knowledge of students and graduates with the requirements of State Educational Standards and additional requirements established by the university.

3.9 Marketing of educational services is a type of university activities aimed at studying the satisfaction of the needs and requirements of consumers, designed to guide the production of educational services to prepare professionals who are in demand in the market.

3.10 Educational monitoring is a systematic observation, analysis, assessment and forecast of the state and dynamics of changes in the results and conditions of educational processes, students, network, as well as rating indicators of achievement of educational organizations.

3.11 Professional practice is a type of educational activity aimed at consolidation of theoretical knowledge, skills, acquisition and development of practical knowledge and competencies in the process of performing certain types of work related to future professional activities.

3.12 The educational program is a united complex of basic characteristics of education, including the goals, results and content of education, the organization of the educational process, methods and techniques of their implementation, evaluation criteria for learning outcomes.

3.13 Educational activity is a process of purposeful, pedagogically sound, consistent interaction between subjects of education, which solves the problem of education, development and upbringing of a personality.

3.14 The final results of student learning are a set of competencies, knowledge and skills that students should have at the end of the given educational program.

3.15 A visit to the university by a commission of external auditors is a component of the external evaluation, which is an accepted part of the accreditation process. External auditors-experts visit the university to check the self-assessment materials of the university's educational

program, to interview the faculty, students, and staff, and to assess the quality and effectiveness of the services provided, as well as to offer recommendations on their improvement. The result of the visit is a report on the audit of educational programs of the higher education institution.

3.16 Competence is the ability to apply one's knowledge, skills and abilities. It manifests itself in personality-oriented activities and characterizes the ability of a specialist to realize his human potential for professional activity.

3.17 Procedure is the established way of performing an activity or process.

3.18 Accreditation standards are documents of accreditation body, which establish requirements for accreditation procedure.

3.19 Student-centered learning is a process of qualitative transformation for students and other learners in the learning environment, aimed at improving their autonomy and critical capacity through a result-oriented approach.

3.20 Quality management system is a set of measures and continuously implemented operations that are used in the organization to achieve the required quality of services or products which are the result of the activities of this organization.

3.21 Intermediate attestation of students is a procedure to assess the quality of students learning the content of part or all of one academic subject, a single discipline and (or) module, as well as professional modules within the same qualification after the completion of their studies.

3.22 University is an organization of higher and (or) postgraduate education, which conducts scientific and pedagogical activities in various fields, personnel training, fundamental and (or) applied scientific research and is a leading scientific and methodological center.

4. Symbols and abbreviations

The following symbols and abbreviations are used in these standards:
SCES – State Compulsory Education Standard;
DLT– Distance learning technologies;
MES RK – Ministry of Education and Science of the Republic of Kazakhstan;
SRW – scientific research work;
ICT – information and communication technology;
ECTS – European Credit Transfer and Accumulation System;
ESG – The Standards and guidelines for quality assurance in the European Higher Education Area;
NQF – National Qualifications Framework;
KAZSEE – Kazakhstan Association for Modern (Elite) Education KAZSEE

5. Principles of specialized accreditation of educational programs

5.1 The presented standards for quality assurance of higher education programs are based on the following principles:

5.1.1 the procedure of specialized accreditation of educational programs of universities is conducted on a voluntary basis;

5.1.2 the main responsibility for the quality of educational programs of higher education rests with the university;

5.1.3 external assessment is carried out objectively, transparently and independently of the intervention of third parties (government agencies, universities and public organizations);

5.1.4 information provided by universities is used by the Kazakhstan Association for Modern (Elite) Education KAZSEE confidentially;

5.1.5 informing the public in the country and abroad about accredited educational programs is carried out by submitting information by the agency to the authorized bodies in the field of education and ENAEE, as well as by posting it on the KAZSEE website.

5.1.6 Kazakhstan Association for Modern (Elite) Education KAZSEE focuses on standards and recommendations for quality assurance in the European Higher Education Area (ESG)

Principles of specialized educational programs accreditation of higher education institutions

Standard 1. Goals of the educational program

1.1 General provisions

1.1.1. The educational program should have clearly formulated and documented goals that are consistent with the educational standards of higher professional education of RK, the mission of the university and meet the needs of potential consumers of the program.

1.1.2. The goals of educational programs should describe the academic, technical, and professional characteristics of the qualification.

Educational institutions should have procedures for developing and approving their programs. Programs should be developed in accordance with the established goals, including the intended learning outcomes.

1.2. **Evaluation criteria**

1.2.1 The KAZSEE evaluation method focuses on the learning outcomes of the program. Learning outcomes must be clearly aligned with the goals of the program.

1.2.2 The concept of program structure should be built in a combination of individual modules, taking into account the formulated goals, forms of learning and teaching.

1.2.3 The requirements for professional practice and the labor market should be reflected and integrated in the development of the educational program and employment. Learning outcomes should be formulated in the form of planned graduate competencies that meet the requirements of the European, national qualifications frameworks, professional standards, labor market demands and EUR-ACE standards:

- Knowledge and understanding;
- Analysis;
- Research;
- Practice;
- Decision Making;
- Communication and teamwork;
- Continuous learning.

1.2.4 The university should develop an effective mechanism to ensure the achievement and adjustment of the goals of educational programs;

1.2.5 The goals of the educational program should be commonly shared by the team of the unit involved in the implementation of the educational program, published and available to all interested parties.

1.2.6 The educational program should provide comprehensive information about all modules, including syllabi, learning outcomes, teaching and learning methods, credit distribution, module assessment method, and other program requirements.

1.2.7 The educational program should ensure that the cumulative outcomes of the modules reflect the learning outcomes of the program, taking into account students' choice of modules. The degree and title of the program correspond to the content of the educational program and the goals of the program.

Standard 2. Program content

2.1 General provisions

2.1.1 The educational program should have clearly articulated and documented learning outcomes that are conceptually consistent with the goals of the educational program.

2.1.2 The structure and content of the educational program should ensure that students achieve the planned learning outcomes.

2.2 Evaluation criteria

2.2.1 The structure of the educational program should cover the following blocks:

- Structure of the educational program in terms of time and content
  - A. Course duration and credit scoring system (ECTS)
  - B. Modularity concept
  - C. Scope of compulsory, elective-compulsory and elective courses
  - D. Rationale for the program during a standard study period
  - E. Assessment and description of the student's workload
- Integration of the latest scientific developments into the curriculum
- Structuring, integration and control of practical stages and / or periods spent abroad
- Description of interdisciplinary courses
- Mechanisms for making courses accessible to students with special needs.

The length of the educational program is sufficient to allow students to e a r n a degree without exceeding the duration of the course. The credit system developed is focused on the workload of the students. The program is structured to avoid excessive workload. The workload includes both tuition-based attendance and independent study. This includes all of the required elements of a degree.

Disciplinary structure of the educational program

- Rationale for the choice and feasibility of evaluation forms
- Integration of d i s t a n c e learning elements and new technology
- Inclusion of a foreign language
- Guaranteed required teaching staff qualifications

2.3 The composition of the teaching staff, material and technical equipment must meet the qualification requirements for licensing of educational activities

2.4 The content of the educational program of bachelor's, master's, doctoral degree should correspond to the number of credits defined in the SCES of RK.

2.5 The curriculum and work program for each discipline should be consistent with the goals of the educational program and ensure that all graduates of the program achieve their learning outcomes.

2.6 The module of disciplines provides fundamental training of a specialist serves as a basis for the study of general professional and specialized disciplines and contains, in addition to the basic, advanced courses.

2.7 Module of disciplines should provide the necessary legal, social, economic, ethical competence of a specialist, to form a commitment to sustainable development, safety and health.

2.7.1 The scope of the module should meet the requirements defined in the SCES of RK for Bachelor's, Master's and Doctoral programs.

2.7.2 Disciplines of the module develop professional communication skills, pose a problem and suggest possible ways to solve it.

2.8 The module of general professional and special disciplines provides completeness of training necessary for professional activity in accordance with the objectives of the educational program.

2.8.1 The study of disciplines should be consistent with the level of knowledge and ensure the ability to apply them in practice.

2.8.2 Design training should foster students' creative thinking and skills to solve problems using the knowledge gained and the original approach. The obligatory elements of

design should be the definition of goals and criteria, analysis, synthesis, construction, testing and evaluation.

2.8.3 A compulsory component of the bachelor's degree program is the passage of practice and for the master's degree is the practice and research and (or) design and development work.

2.9 Training on the program should be concluded with a final qualification work, containing elements of scientific research or experimental and design activity.

Learning outcomes should meet professional standards and EUR-ACE requirements (Appendix A).

Standard 3. Students and educational process

3.1 General provisions

3.1.1 Introducing student-centered learning into its programs, the university should be guided to the maximum extent by the individual characteristics of the students and their specific personal understanding of the world. The methods through which the programs are implemented should stimulate students to take an active role in the joint construction of the educational process.

3.1.2 The university should ensure that educational programs are developed to motivate students to take an active role in co-creating the learning process, and students' assessments should reflect this approach.

3.1.3 The program should be developed in accordance with the planned learning outcomes, and the teaching and learning approaches used should be adequate to achieve these outcomes.

3.2 Evaluation criteria

3.2.1 Students admitted to the program must have a high school or secondary vocational education for a bachelor's degree, a bachelor's degree for a master's degree, and a master's degree for a doctoral degree program.

3.2.2 Students should have a sufficient level of knowledge to master the educational program. For students with poor preparation a system should be provided to ensure the mastery of the educational program.

3.2.3 The educational process should ensure that all students have achieved learning outcomes. The educational program should have a mechanism to ensure continuous monitoring of the curriculum and feedback for its improvement.

3.2.4 The university should provide opportunities for students to practice their specialty in scientific laboratories and enterprises and monitor the satisfaction of students, heads of enterprises at the place of practice and employers.

3.2.5 An important factor is to ensure the possibility of foreign and domestic academic mobility for students. The university should have its own mechanisms to recognize the results of academic mobility of students.

3.2.6 Students and trainees should be directly involved in the internal quality assurance system of educational programs.

3.2.7 The university should have an effective system of support for students.

3.2.8 The rules for examinations and assessment of achieved learning outcomes should be consistent with the planned learning outcomes.

3.2.9 The university creates conditions for the effective promotion of the student on an individual educational trajectory, including consultations of advisers.

3.2.10 An important factor is the involvement of students in SRW.

3.2.11 The university should create favorable conditions for attracting and educating foreign students.

3.2.12 The university should develop a special program to support the gifted students.

3.2.13 The university should provide opportunities for students to communicate with each other through the creation of various student organizations, forums, online communities, etc..

3.2.14 The university should create a mechanism for monitoring student satisfaction with the activities of the university in general and with individual services in particular. The university should organize special mechanisms for dealing with student complaints.

3.2.15 The university should demonstrate the functioning of the feedback system, including the prompt provision of information on the results of the assessment of students' knowledge.

Стандарт 4. Teaching staff

4.1 General provisions

4.1.1 The university should be confident in the competence of its teaching staff. The university should have objective and transparent hiring processes, professional growth and development of the teaching staff;

4.1.2 The university should organize events aimed at developing and improving the qualifications of the teaching staff, administrative and managerial personnel and university staff;

4.1.3 The university should regulate the organizational and functional structure of personnel management and development, including the recruitment system;

4.1.4 The university should ensure that the qualifications of the teaching staff meet the needs of educational programs;

4.1.5 The university should have functioning mechanisms for motivation and incentives for employees, adaptation of new employees, certification and disciplinary measures in relation to employees, dismissing employees.

4.2 Evaluation criteria

4.2.1 The teaching staff should be represented by specialists in all fields of knowledge covered by the educational program.

4.2.2 Information about the teaching staff should be available to the public, the university should keep them in the public domain, the professors' questionnaires should be posted on the university website.

4.2.3 The university should ensure the monitoring of the teaching staff, a systematic assessment of the competence of teachers, a comprehensive assessment of the quality of teaching. Also, the university should organize various mechanisms for assessing the quality of teaching, such as questioning students about the quality of teaching at the university, attending teaching staff classes, questioning the teaching staff about evaluating the activities of colleagues, etc.

4.2.4 The teacher's workload should include educational and methodical, scientific work (including the preparation of projects and applications), organizational and methodological work (including participation and organization of various events), professional competence development (professional development, including personal development and study of specialty literature), activities in a professional environment (for example, participation in professional associations and consulting).

4.2.5 The university should ensure the completeness and adequacy of individual planning of the work of the teaching staff in all types of activities, monitoring the effectiveness and efficiency of individual plans.

4.2.6 The university should demonstrate the existence of a system of advanced training, professional and personal development of teaching staff and administrative and managerial personnel.

4.2.7 The university should support young faculty, have a defined plan for the development of young faculty.

4.2.8 The university should ensure the monitoring of the satisfaction of the teaching staff through special methods. The management of the university should respond to the requests of the teaching staff on various issues.

4.2.9 The teaching staff should actively use information and communication technologies in the educational process (e-learning, m-learning, etc.).

4.2.10 The university should develop academic mobility of the teaching staff, attract the best foreign and domestic faculty, conduct joint research. Also, to promote their own teaching staff to participate in academic mobility programs.

4.2.11 The university should create conditions for the teaching staff to participate in public life, to make their contribution to the development of science, culture of the region.

4.2.12 An important factor is the involvement of practitioners, representatives of industry and various sectors of the national economy as teachers.

4.2.13 The teaching staff having experience in the relevant industry and performing research projects is an important advantage.

4.2.14 The teaching staff should participate in the process of improving the educational program as a whole and its individual disciplines in accordance with the internal mechanisms of quality assurance.

4.2.15 Teaching staff participating in professional societies, receiving scholarships and grants, and being members of academies is an advantage.

4.2.16 Teachers should be actively involved in research, design and scientific and methodological work, which must be confirmed by reports on research and scientific and methodical works, participation in scientific conferences, as well as the presence of at least two scientific publications per year for each teacher over the past five years.

4.2.17 Each teacher should know and be able to justify the place of their discipline in the curriculum, its relationship to previous and subsequent disciplines, and understand the role of the discipline in the formation of a specialist.

4.2.18 Teaching staff turnover should not exceed 30% during the accreditation period.

Standard 5. Preparation for professional activity

5.1.1 General provisions

5.1.2 Preparation for the activities should be carried out during the entire period of the program. Experience of research and project activities should be formed in the process of implementation of projects, necessarily including economic, ethical, socio-political and environmental aspects, issues of sustainable development and labor safety.

5.1.3 The university should operate a system of internal quality control, based on European standards and recommendations for quality assurance in the European Higher Education Area (ESG).

5.1.4 The university/unit should have a mechanism for evaluating the learning outcomes of the program as a whole and individual disciplines and documents confirming their achievement. Based on the data received from all stakeholders, educational programs should be improved and developed.

5.2 Evaluation criteria

The educational program should ensure that all students achieve the learning outcomes necessary for professional practice. Upon completion of the program, the students should:

5.2.1 demonstrate basic knowledge and understanding of the scientific principles underlying professional activities;

5.2.2 have an awareness of advanced knowledge in some areas of professional activity;

5.2.3 apply the knowledge gained to identify, formulate, and solve problems using appropriate methods;

5.2.4 be able to select and apply appropriate analytical and design methods;
5.2.5 be able to find the necessary literature, databases and other sources of information;
5.2.6 be able to plan and conduct an experiment, interpret data, and draw conclusions;
5.2.7 be able to select and use the appropriate equipment, facilities and tools;
5.2.8 be able to combine theory, practice, and methods to solve problems and understand their application;
5.2.9 work effectively individually as well as as a team member on an interdisciplinary topic;
5.2.10 have a broad erudition, including knowledge and understanding of contemporary social and political issues;
5.2.11 know a foreign language at a level that allows them to work in an international environment with an understanding of cultural, linguistic, and socio-economic differences;
5.2.12 demonstrate an understanding of safety and health issues, legal considerations, responsibility for operations, the impact of decisions on the social context and the environment;
5.2.13 follow a code of professional ethics, responsibility, and performance standards;
5.2.14 understand the need and be able to independently learn and improve their skills throughout their professional life.

Standard 6. Material and technical base

6.1.1 General provisions
6.1.2 The university should constantly update and improve the material, technical and information resources to ensure the quality of educational programs.
6.1.3 Material support should not be lower than the licensing indicators.
6.1.4 Students should have sufficient opportunities for independent study and research.

6.2 Evaluation criteria
6.2.1 The university/department should continually update, improve, and expand its facilities. Classrooms, laboratories and their equipment should be modern and adequate to the program goals.
6.2.2 The university should assess the dynamics of development of material and technical resources and information support, the effectiveness of the use of assessment results for adjustments in planning and budget allocation.
6.2.3 The university should have the necessary number of computer classes, reading rooms, multimedia, language laboratories and scientific-methodological classrooms, the number of seats in them.
6.2.4 The university library should have a sufficient book fund, including a fund of educational, methodical and scientific literature on general education, basic and major disciplines in paper and electronic media, periodicals in the languages of instruction, as well as scientific databases, a database of electronic scientific journals.
6.2.5 Educational materials, software, educational literature and additional resources, and equipment should be available to all students.
6.2.6 An important factor is the support of the educational program by information and communication technologies.
6.2.7 The university should provide educational programs with the necessary laboratories, polygons, etc.
6.2.8 The university should determine the degree of implementation of information technologies in the educational process, monitor the use and development of innovative learning technologies by teaching staff.
6.2.9 The effectiveness and adequacy of the ICT use is considered at meetings of the University Academic Council and other collegial bodies.

6.2.10 An important factor is the creation of conditions for mastering and using ICTs by employees, teaching staff and students in the educational process and university activities.

3.2.16 The university should create the most favorable conditions for extracurricular activities of students. The service center, canteen, dormitory, computer center, library, reading rooms, gyms, stadium, medical center, etc. should provide services for students.

Standard 7. Information support

7.1.1 General provisions

7.1.2 Information support should be adequate to the goals of the program.

7.1.3 Free access to information resources for students and faculty is an important factor.

7.2 Evaluation criteria

7.2.1 The university/department should have a library containing materials necessary for teaching: educational, technical and reference literature, various periodicals, etc.

7.2.2 Students and faculty should have computer labs and terminals with access to information resources (local area network, Internet). The institution/unit should monitor the availability and use of these resources.

7.2.3 The university/department should constantly update, improve and expand the information base.

7.2.4 The university should have its own personalized interactive resource (univer, Platonus, etc.).

7.2.5 Free Wi-Fi should be available throughout the university.

7.2.6 The university should provide students with information, reference and methodological materials necessary for mastering the educational program (guidebook, academic policy of the university, academic calendar, etc.).

7.2.7 The university should demonstrate the availability of a web resource in three languages, reflecting the mission, goals and objectives of the university, where all information about the activities of the university, complete information about the teaching staff, the rector's personal e-mail, a virtual book of complaints, etc. are placed.

7.2.8 The university should provide students with open access to information about university activities and available grants and scholarships.

Standard 8. Finance and management

8.1.1 General provisions

8.1.2 Educational organizations must have adequate funding for teaching and learning activities and adequate and accessible educational resources and student support services.

8.1.3 The financial system of the university should be stable, effective, efficient, independent and transparent.

8.2 Evaluation criteria

8.2.1 The financial support of the program should not be lower than the licensing indicators.

8.2.2 The financial and administrative policies of the university/department should be aimed at improving the quality of the educational program.

8.2.3 The resource policy of the university/department should be aimed at maintaining and ensuring continuous professional growth of the teaching staff.

8.2.4 The academic support staff and administrative activities of the university/department should meet the needs of the educational program.

8.2.5 Management of the university/department should be effective and ensure the improvement of the educational program.

8.2.6 An important factor is the availability of a quality management system in the university / department, certified by independent organizations.

8.2.7 The university should have an internal quality assurance system.

8.2.8 Funding should be results-oriented, the university should have a mechanism for assessing the adequacy of funding for educational programs.

8.2.9 The university should have an effective financial reporting mechanism.

8.2.10 Each division or project team of the university should have their own funds and the right to dispose them independently.

8.2.11 The university should have a transparent system of remuneration of teaching staff.

Standard 9. Graduates

9.1.1 General provisions

9.1.2 The university should make the maximum amount of effort to provide graduates with employment.

9.1.3 The university/department should have a system for studying employment, demand, career support and continuous professional development of university graduates.

9.2 Evaluation criteria

9.2.1 The qualification obtained upon completion of the educational program should meet all the requirements of the national qualification system.

9.2.2 The data obtained on the employment of graduates should be used to further improve educational programs.

9.2.3 The university should keep in touch with the graduates and support the various endeavors of its graduate students.

9.2.4 University graduates create communities or associations of alumni of the given university.

9.2.5 An important factor is the monitoring of employment and professional activities of graduates.

9.2.6 The university should provide its graduates with diplomas confirming the qualifications obtained, as well as detailed annexes to the diplomas in three languages.

APPENDIX A

Bachelor program learning outcomes based on the European Network for Quality Assurance in Engineering Education (ENAEE) framework standards and EUR-ACE guidelines

KNOWLEDGE AND UNDERSTANDING

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- knowledge and understanding of the mathematics and other basic sciences that are the foundation of their engineering specialization, at a level necessary to achieve the other program learning outcomes;
- Knowledge and understanding of the engineering disciplines that are the foundation of their specialization at a level necessary to achieve other learning outcomes, including some awareness in their advanced fields;
- awareness in the broad interdisciplinary context of engineering.

ENGINEERING ANALYSIS

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- the ability to analyze complex engineering products, processes, and systems in their areas of study; to select and apply appropriate methods from appropriate analytical, computational, and experimental methods; and to correctly interpret the results of such analyses;
- the ability to identify, formulate, and solve technical problems in their areas of study; select and apply appropriate methods from appropriate analytical, computational, and experimental methods; recognize the importance of non-technical constraints: social, health and safety, environmental, economic, and industrial.

ENGINEERING DESIGN

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- the ability to develop and design complex products (devices, artifacts, etc.), processes and systems in their field of study, according to established requirements, which may include awareness of non-technical factors: social, health and safety, environmental, economic and industrial; select and apply appropriate design methodologies;
- the ability to design using some understanding in new areas of their specialty.

RESEARCH

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- the ability to conduct literature searches, consultations, use scientific databases and other relevant sources of information, and perform modeling and analysis in order to conduct detailed study and research on issues of a technical nature in their field of study;
- the ability to advise and apply standards of practice and safety rules in their field of study;
- laboratory/practical skills and ability to design and conduct experimental studies, interpret data, and draw conclusions in their field of study.

ENGINEERING PRACTICE

In the course of their studies, students in the Bachelor's degree program should

demonstrate:

- understanding of the applied techniques and methods of analysis, design, research and the shortcomings in their field of study;
- practical skills in solving complex problems, in the implementation of complex engineering structures and research in their field of study;
- understanding of the materials, equipment and tools used, engineering technology and processes, and the deficiencies in their field of study;
- the ability to apply the standards of engineering practice to their field of study;
- be aware of the impact of non-technical engineering practices: society, health and safety, the environment, and industry;
- be knowledgeable in economic, organizational, and management issues (such as "project management," "risk and change management") in an industrial and business context.

MAKING DECISIONS

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- ability to collect and interpret relevant data and to handle complex problems in the field of work, to be able to make judgments that reflect relevant social and ethical issues;
- ability to manage complex technical or professional issues, or projects in their field of study, taking responsibility for decision-making.

COMMUNICATION AND TEAMWORK

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- the ability to effectively share information, ideas, problems, and solutions with the engineering community and society at large;
- the ability to work effectively nationally and internationally as an individual and team member and to collaborate effectively with engineers and non-engineers.

LIFELONG EDUCATION

In the course of their studies, students in the Bachelor's degree program should demonstrate:

- the bility to recognize the need for and engage in independent lifelong learning;
- opportunity to follow developments in science and technology.

APPENDIX B

Master's program learning outcomes based on the European Network for Quality Assurance in Engineering Education (ENAEE) framework standards and EUR-ACE guidelines

KNOWLEDGE AND UNDERSTANDING

In the course of their studies, students in the Master's program should demonstrate:

- a thorough knowledge and understanding of the mathematics and other basic sciences that are the foundation of their engineering specialization, at a level necessary to achieve the other program learning outcomes;
- a thorough knowledge and understanding of the engineering disciplines that are the basis of their specialization, at a level necessary to achieve the other learning outcomes;
- awareness of advanced knowledge in areas of professional activity;
- awareness of the broad interdisciplinary context of engineering and knowledge of problems in various fields of engineering.

ENGINEERING ANALYSIS

In the course of their studies, students in the Master's program should demonstrate:

- the ability to analyze new complex engineering products, processes, and systems in broad interdisciplinary contexts; to select and apply the most appropriate methods from appropriate analytical, computational, and experimental or novel innovative methods; and to interpret the results of such analyses in detail;
- the ability to conceptualize engineering products, processes, and systems;
- the ability to identify, formulate and solve unknown complex problems that have undefined complex specifics possible from outside the field of study and non-technical nature: social, health and safety, environmental, economic, and industrial;
- select and apply the most appropriate techniques from appropriate analytical, computational, and experimental or new innovative methods in solving problems;
- the ability to identify, formulate, and solve complex problems in new and emerging areas of their expertise.

ENGINEERING DESIGN

In the course of their studies, students in the Master's program should demonstrate:

- the ability to develop and design new and complex products (devices, artefacts, etc.), processes and systems with specifics that are not fully defined, requiring integrated knowledge from different fields including awareness of non-technical factors - social, health and safety, environmental, economic and industrial; select and apply appropriate design methodologies or use creative thinking to develop new original design methods;
- the ability to design using advanced knowledge and skills in the engineering specialization.

RESEARCH

In the course of their studies, students in the Master's program should demonstrate:

- the ability to identify, define and obtain the necessary information;
- the ability to find literature, consult, use scientific databases and other information sources, and carry out modelling and analysis for detailed study and research on complex technical issues;
- the ability to consult and apply the standards of practice and safety regulations in their field of study;
- laboratory/practical skills and ability to design and conduct experimental studies, interpret data and draw conclusions in their field of study;

- the ability to analyze the application of new and developing technologies in the advanced field of engineering specialization.

ENGINEERING PRACTICE

In the course of their studies, students in the Master's program should demonstrate:

- a broad understanding of the techniques and methods of analysis, design, research, and shortcomings in their field of study;
- practical skills, including the use of computer technology to solve complex problems, to create elaborate engineering designs and conduct complex studies in their field of study;
- a broad understanding of the materials, equipment, and tools used, the engineering technology and processes, and the shortcomings in their field of study;
- the ability to apply the standards of engineering practice in their field of study;
- knowledge and understanding of non-technical areas: society, health and safety, environment and industry with implications in engineering practice;
- be knowledgeable in economic, organizational, and management issues (such as "project management", "risk and change management") in an industrial and business context.

MAKING DECISIONS

In the course of their studies, students in the Master's program should demonstrate:

- the ability to integrate knowledge and cope with complex problems in their field of work, making decisions based on incomplete or limited information, which reflect appropriate social and ethical responsibilities related to the application of their knowledge and judgement;
- the ability to manage complex technical or professional issues or projects that require new strategic approaches, taking responsibility for decision-making.

COMMUNICATION AND TEAMWORK

In the course of their studies, students in the Master's program should demonstrate:

- the ability to use a variety of methods to draw clear and unambiguous conclusions and rationally justify these to specialist and non-specialist audiences at national and international levels;
- the ability to work effectively nationally and internationally, as a member and leader of a team composed of different professionals and levels, the ability to use broad communication skills.

LIFELONG EDUCATION

In the course of their studies, students in the Master's program should demonstrate:

- the ability to continually improve their skills in their professional life;
- the ability to continue learning independently.