ASIIN Seal & Euromaster®

Accreditation Report

Master's Degree Programmes
Chemical Technology of Inorganic Substances
Chemical Technology of Organic Substances

Provided by
M. Auezov South Kazakhstan University

Version: October 1, 2026

Final Version

Table of Content

A About the Accreditation Process 3

B Characteristics of the Degree Programmes 5

1 Accreditation Status 5
2 Numbers and facts 7
3 Characteristics and features 8

C Expert Report for the ASIIN Seal 9

1. The Degree Programme: Concept, Content & Implementation 9
2. Exams: System, Concept and Organisation 25
3. Resources 27
4. Transparency and Documentation 34
5. Quality Management: Quality Assessment and Development 38

D Additional Documents 41

E Comment of the Higher Education Institution 42

F Summary: Expert recommendations (10.08.2026) 56

G Comment of the Technical Committees 01 and 09 57

Technical Committee 01 – Mechanical Engineering/Process Engineering (11.09.2026) 57
Technical Committee 09 – Chemistry, Pharmacy (08.09.2026) 58

H Decision of the Accreditation Commission (25.09.2026) 60

Appendix: Programme Learning Outcomes and Curricula 61

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for	Involved Technical Committees (TC)[1]
Бейорганикалық заттардың химиялықтехнологиясы	Ma Chemical Technology of Inorganic Substances	ASIIN, Euro-master® Label	TC 01, TC 09
Органикалық заттардың химиялық технологиясы	Ma Chemical Technology of Organic Substances	ASIIN, Euro-master® Label	TC 01, TC 09

Date of the contract: 10.10.2025

Submission of the final version of the self-assessment report: 13.03.2026

Date of the onsite visit: 10.-11.06.2026

at: M. Auezov South Kazakhstan University, Shymkent, Kazakhstan

Expert panel:

Prof. Dr. Richard Korff, FH Münster University of Applied Sciences;

Prof. Dr. Heinrich Lang, Technical University Chemnitz;

Dauren Akhanov, Shymkent Chemical Company;

Sabyrzhan Tolegen, Satbayev University

Representative of the ASIIN headquarter: Julia Tohidi Sardasht

Responsible decision-making committee: Accreditation Commission for Degree Programmes

Criteria used:

European Standards and Guidelines as of May 15, 2015

ASIIN General Criteria, as of March 28, 2023

[1] TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering; TC 02 – Electrical Engineering/Information Technology; TC 03 – Civil Engineering, Geodesy and Architecture; TC 04 – Informatics/Computer Science; TC 05 – Materials Science, Physical Technologies; TC 06 – Engineering and Management, Economics; TC 07 – Business Informatics/Information Systems; TC 08 – Agriculture, Forestry, Food Sciences, and Landscape Architecture; TC 09 – Chemistry; TC 10 - Life Sciences; TC 11 – Geosciences; TC 12 – Mathematics; TC 13 – Physics; TC 14 – Medicine.

Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of December 9, 2011 and Technical Committee 09 – Chemistry, Pharmacy as of March 29, 2019

B Characteristics of the Degree Programmes

1 Accreditation Status

Result Overview

The most recent decision for the ASIIN Seal was made by the ASIIN Accreditation Commission on 25.09.2026.

Degree Programmes	ASIIN Seal	Validity	EuroMaster®	Validity
Ma Chemical Technology of Inorganic Substances	Accredited with requirements	16.10.2026 – 16.10.2027	Accredited with requirements	16.10.2026 – 16.10.2027
Ma Chemical Technology of Organic Substances	Accredited with requirements	16.10.2026 – 16.10.2027	Accredited with requirements	16.10.2026 – 16.10.2027

Fulfilment of the Accreditation Criteria

ASIIN General Criteria / Subject-Specific Criteria	Ma Chemical Technology of Inorganic Substances	Ma Chemical Technology of Organic Substances
1 Degree programme: Concept, Content & Implementation		
1.1 Objectives and learning outcomes (intended qualification profile)	**Not fulfilled** **Requirement A 1**	**Not fulfilled** **Requirement A 1**
1.2 Title of the degree programme	Fulfilled	Fulfilled
1.3 Curriculum	Fulfilled	Fulfilled
1.4 Admission requirements	Fulfilled	Fulfilled
1.5 Workload and credits	Fulfilled	Fulfilled

ASIIN General Criteria / Subject-Specific Criteria	Ma Chemical Technology of Inorganic Substances	Ma Chemical Technology of Organic Substances
1.6 Didactics and teaching methodology	Fulfilled	Fulfilled
2 Exams: System, Concept and Organisation		
2 Exams: System, Concept and Organisation	Fulfilled	Fulfilled
3 Resources		
3.1 Staff and staff development	Fulfilled	Fulfilled
3.2 Student support and student services	Fulfilled	Fulfilled
3.2 Funds and equipment	Fulfilled	Fulfilled
4 Transparency and Documentation		
4.1 Module descriptions	**Not fulfilled** **Requirement A 2**	**Not fulfilled** **Requirement A 2**
4.2 Diploma and Diploma Supplement	Fulfilled	Fulfilled
4.3 Relevant rules	Fulfilled	Fulfilled
5 Quality Management: Quality Assessment and Development		
5 Quality Management: Quality Assessment and Development	Fulfilled	Fulfilled

Requirements

Applicable to both programmes

A 1. (ASIIN 1.1) Ensure that the intended learning outcomes are transparently anchored and published, making them accessible to all relevant stakeholders.

A 2. (ASIIN 4.1) Ensure that all module descriptions are publicly available and accessible to all stakeholders in a consistent and transparent manner.

Accreditation History

Ma Chemical Technology of Inorganic Substances

ASIIN Seal	Validity	Euromaster®	Validity
Initial accreditation [with requirements]	17.09.2021 – 08.10.2022	Initial accreditation [with requirements]	17.09.2021 – 08.10.2022
Initial accreditation for full duration [plus a prolongation]	17.09.2021 – 30.09.2026	Initial accreditation for full duration [plus a prolongation]	17.09.2021 – 30.09.2026

Ma Chemical Technology of Organic Substances

ASIIN Seal	Validity	Euromaster®	Validity
Initial accreditation [with requirements]	17.09.2021 – 08.10.2022	Initial accreditation [with requirements]	17.09.2021 – 08.10.2022
Initial accreditation for full duration [plus a prolongation]	17.09.2021 – 30.09.2026	Initial accreditation for full duration [plus a prolongation]	17.09.2021 – 30.09.2026

2 Numbers and facts

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[2]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Chemical Technology of Inorganic Substances	Master of Technical Sciences	Technology of inorganic acids, salts, and mineral fertilizers	7	Full time	no	4 Semesters	120 ECTS/ 120 academic credits KZ	Twice a year: autumn and spring semesters; first time of offer: 1999
Chemical Technology of Organic Substances	Master of Technical Sciences	Oil and gas, petroleum refining, and petrochemical industries	7	Full time	no	4 Semesters	120 ECTS/ 120 academic credits KZ	Twice a year: autumn and spring semesters; first time of offer: 2004

[2] EQF = The European Qualifications Framework for lifelong learning

3 Characteristics and features

For the Master's degree programme Chemical Technology of Inorganic Substances (CTIS) the institution has the following programme goal: "Training of highly demanded research and teaching personnel in the field of Chemical Engineering for the higher education system and the scientific sector". Moreover, the SAR states that the programme "includes the study of the chemical technology of inorganic acids, salts, and fertilizers, the design and modernization of inorganic substance production facilities, scientific research into new methods of processing mineral and industrial raw materials, and waste disposal. Upon successful completion of the degree programme the graduate is prepared to work as a teacher in higher education institutions, a chemical engineer and leading designer in research and design institutes, a shift supervisor, chief technologist or head of a control center at industrial enterprises producing inorganic compounds."

For the Master's degree programme Chemical Technology of Organic Substances (CTOS) the institution has the following programme goal: "Training of highly qualified specialists who master modern approaches to production organization and enterprise management, as well as technological design, and who are capable of carrying out scientific and pedagogical activities". Moreover, according to the SAR, "[the] degree programme is characterized by its practical orientation and focus on the regional market and social order through the development of professional competencies adjusted to meet stakeholder requirements. The programme covers the study of petrochemical synthesis processes, deep processing of hydrocarbon raw materials, design of chemical reactors, scientific foundations for the creation of polymer composite materials, ways to intensify the production and processing of elastomers, design and implementation of complex and interdisciplinary research. Particular attention is paid to the development of an innovative approach to the modernization of production based on the latest achievements of science and technology."

C Expert Report for the ASIIN Seal[3]

1. The Degree Programme: Concept, Content & Implementation

Criterion 1.1 Objectives and Learning Outcomes of a Degree Programme (Intended Qualifications Profile)

Evidence:

- Self-Assessment Report
- University websites linked in the SAR:
    - Master Chemical Technology of Inorganic Substances: https://aue-zov.edu.kz/media/attachments/2026/03/11/4.pdf
    - Master Chemical Technology of Organic Substances: https://aue-zov.edu.kz/media/attachments/2026/03/11/.-.pdf
- Learning outcomes (app. 05-01 and 05-02)
- Diploma supplements (app. 06-DS-01 and 06-DS-02)
- Objective-module matrices (app. 07-01 and 07-02)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:

As outlined in the SAR, the degree programmes and learning outcomes are developed with the input of all stakeholders (academic staff, employer representatives, and students). Moreover, the learning outcomes of the programmes assessed here "have been developed in accordance with the requirements of the professional activity area, represented by the sectoral Qualifications Framework 'Chemical Production,' which directly corresponds to the labour functions established in the professional standards developed by the National Chamber of Entrepreneurs 'Atameken'". For each programme, as outlined in the appendix of the report, the university defines one general programme goal and several learning outcomes. The learning outcomes are also listed on the respective diploma supplements. On the level of the individual modules, the submitted matrices indicate which module

[3] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

corresponds to which learning outcome. The experts find that this corresponds to the ASIIN requirement that programme objectives and learning outcomes must be briefly and concisely described, transparently anchored and published, and mapped to the relevant academic and professional qualification level.

For the Master of Chemical Technology of Inorganic Substances (CTIS), the graduate profile contains the role of research and teaching staff in higher education Chemical Engineering and the scientific and production sector. According to the SAR, the programme was developed with the participation of LLP "KAZNIIKHIMPROEKT" and also involved master's students. During the onsite visit, the experts learned that the programme is closely linked to local (and national) industry needs. The programme coordinators explained that stakeholder involvement is institutionalised through the internal quality management system.

For the Master of Chemical Technology of Organic Substances (CTOS) the corresponding graduate profile comprises the roles of production organisation, enterprise management, technological design, and scientific and pedagogical work. The programme was developed with the participation of business partners LLP "Eco-Shina" and LLP "Neftekhimstroy-Yug". During the onsite visit, the experts could confirm that this programme, too, is embedded in a strong regional industry context.

Industry representatives confirmed that graduates of Auezov University are generally well prepared, practice-oriented, and well qualified. Representatives from industry and other higher education institutions stated that they employ graduates of the university and that the graduates' qualification profile generally matches labour-market expectations. The experts also see that the graduates are qualified in their respective disciplines with a focus on the local labour market. With respect to technical competences, their qualification is comparable to European standards.

The labour-market relevance of both programmes was also confirmed by the industry representatives. They stated that the regional chemical, refinery, phosphorous, production, and related sectors require a growing qualified workforce and that the number of graduates is currently insufficient to meet industry demand. Master's graduates are particularly relevant for positions requiring more specific knowledge, engineering competences, and research and development capacities, while Bachelor graduates are also employed in large numbers. This confirms that the intended competence profiles enable graduates to take up professional activities corresponding to the Master's qualification level and that both programmes respond to a clear labour-market need. Graduates of both programmes are qualified for jobs in chemical technology and chemical/process engineering. Nevertheless, their training in specific industrial engineering software could be strengthened, as will be discussed later in this report.

Regarding the mapping of the learning outcomes for both programmes against the subject-specific criteria, the experts find that the provided matrices clearly map the programmes' learning outcomes against the SSC of TC 09 - Chemistry, Pharmacy. Thus, the experts consider the requirements for the award of the Euromaster label to be covered insofar as the SSC of TC 09 are fulfilled. However, in the mapping against the SSC of TC 01 – Mechanical Engineering/Process Engineering, for both programmes the university uses a mix of the criteria for practically oriented programmes and research-oriented programmes. While the SAR presents the CTIS programme as more research-oriented and the CTOS programme as more practice-oriented, the onsite discussions showed that the programme coordinators understand both programmes as research-oriented Master's programmes. This is particularly relevant for the further presentation of the intended qualification profiles. For the CTIS programme, the research and scientific-production profile is already clearly reflected in the stated graduate roles. For the CTOS programme, the profile also contains scientific and pedagogical work, but additionally emphasises production organisation, enterprise management and technological design.

In terms of accessibility of the learning outcomes to all stakeholders, the SAR references the above-mentioned websites which are identical to the submitted appendices 05-01 and 05-02. However, it is not clear where on the university website interested parties can find those links. Also, a date in the URL suggests that the uploads have only been made available in the course of this accreditation procedure. During the onsite visit, however, the students stated that they are familiar with the training objectives and learning outcomes and can find the correlating programme learning outcomes for a given course in the respective syllabi and the module handbook. The experts therefore conclude that the learning outcomes are accessible to enrolled students, although the public visibility for external stakeholders should be presented more transparently.

In terms of regular review of the programmes, the SAR states that the learning outcomes are reviewed and adapted annually, if necessary. The experts learned during the audit that this review is embedded in a broader internal and external quality assurance framework. At programme level, stakeholder feedback is collected by the departmental working group and transferred into proposals for changes to learning outcomes and curricula. These proposals are then processed through the academic quality committee, the educational council, and the rectorate. In addition, the programme coordinators explained that, for new programmes, a ministry review is required in which two anonymous external experts from other universities assess the programmes from the perspective of the learning outcomes. If the achievement coefficient exceeds 75%, the programme may enter the national registry and accept students. In the SAR, the university states that the CTIS programme and CTOS programme achieved a "learning outcomes achievement rate" of 76.6% and 84.1%

respectively. The coordinators also reported yearly external reviews and regular internal review procedures.

In summary, the experts confirm that the objectives and learning outcomes of both programmes are defined, linked to national professional standards and qualification frameworks, mapped to the relevant modules, and regularly reviewed with the involvement of academic staff, students, employers, and external reviewers. The onsite discussions confirmed the labour-market relevance and general appropriateness of the intended qualification profiles. Nevertheless, the experts see room for improvement in making the learning outcomes transparently available to all stakeholders.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-Assessment Report
- Regulation on the Development and Approval of Degree Programmes (app. 06)
- Websites of both study programmes
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
As the experts confirm, both programme names adequately reflect their respective profiles and curricular contents in line with both national and international denominations standards and definitions. The names in both their Kazakh original version as well as their corresponding English translation are consistently used in all official documents and on all websites. Furthermore, the names are included in the Register of Degree programmes of the Ministry of Science and Higher Education of the Republic of Kazakhstan.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Regulation on the Academic Quality (app. 02-03)
- Objective-module matrices (app. 07-01 and 07-02)
- Curricular overview of each study programme (app. 08-01 and 08-02)
- On the Development and Approval of Curricula (app. 08-03)
- Module handbook of each study programme (app. 09-01 and 09-02)
- Statistics on Student Mobility (app. 10-01)
- Information on Academic Mobility (app. 10-02)

- Procedure for Organizing Research Internships for Masters and Doctoral Students (app. 10-03)
- Regulation on the recognition of learning outcomes (app. 13-01)
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Structure and content

Both programmes are designed for a regular full-time study duration of 2 years (4 semesters) and comprise 120 ECTS. The curricula follow a modular structure that encompasses university modules, electives, professional practice (internship), research work, and the final thesis. The university modules include History and Philosophy of Science, Foreign Language (Professional), Pedagogy and Psychology of Higher Education, Psychology of Management, Pedagogical Practice, and sum up to a total of 20 ECTS. The electives can be chosen by the students and reflect labour market needs. The SAR states that the electives "carry the greatest weight in the curriculum". The specific learning outcomes and teaching contents of each course as well as their relevance and contribution to the overall PLOs are transparently outlined in the module handbooks (app. 09-01 and 09-02) and the objective-module matrix of each programme (app. 07-01 and 07-02).

As is common in the Kazakh higher education system and as discussed in the previous accreditation report, the curricula comprise mandatory and elective modules, internships, research components, and the final Master's thesis. Mandatory components are partly determined by national regulations, while elective modules can be designed by the university, usually in consultation with potential employers and other stakeholders. Students create their individual study plans on the basis of the module handbook and in consultation with their advisors. During the audit, the programme coordinators explained that, in the curriculum tables, the modules where two options are listed represent the elective choices available to students. The students confirmed that they can choose electives according to their interests and that their study advisors support them in this process. They further stated that course information is available in the syllabi and module handbooks.

The curriculum of the Master of Chemical Technology of Inorganic Substances covers chemical technology of inorganic acids, salts, and fertilizers, the design and modernization of inorganic substance production facilities, scientific research into new methods of processing mineral and industrial raw materials, and waste disposal. The first two semesters emphasize the abovementioned university modules and courses on inorganic compounds, physicochemical and graphical analysis, multicomponent systems, thermodynamics, fertilizer applications, structural materials, physical chemistry, mineral acids, soda ash,

phosphates and nitrates, reactive acids and salts, and research work. In the second year, students study adsorption processes, inorganic polymer technology, feed salts, mathematical planning and processing of experimental results, waste processing, environmental risk management, mineral fertilizer production, processing mineral raw materials, electrochemical technology, and electroplating. Moreover, students do their internship, engage in further research work, and work on their thesis. The experts confirm that the curriculum covers all central topics related to chemical technology of inorganic substances.

The curriculum of the Master of Chemical Technology of Organic Substances covers petrochemical synthesis processes, deep processing of hydrocarbon raw materials, design of chemical reactors, scientific foundations for the creation of polymer composite materials, ways to intensify the production and processing of elastomers, and the design and implementation of complex and interdisciplinary research. The first two semesters emphasize the abovementioned university modules and courses on resource-saving technologies, motor fuel production from hydrocarbon raw materials, nanostructured polymeric materials, elastomers, petrochemical synthesis, innovative technologies in oil refining and petrochemistry, petrochemical leaders, chemical reactor design, creation of polymer composite materials, tire production processes, organic gas chemistry, production of soot from gas feedstock, and research work. In the second year, courses cover biologically active additives, sulphur obtaining, synthetic fibres, heavy oil and oil residue processing, additives for fuels and oils, elastomer compounds, specialty petroleum refining, industrial ecology of hydrocarbon systems, modelling of chemical engineering processes, and bio dispersions. Moreover, students do their internship, engage in further research work, and work on their thesis. The experts confirm that the curriculum covers the central topics related to chemical technology of organic substances.

For practical training, as stated above, both programmes contain internships in the third semester which last 14 calendar days (app. 10-03) and award 6 ECTS (app. 08-01, 08-02, 09-01, 09-02). There, students are supposed to “enhance [their] professional development and to acquire, consolidate, and refine their professional knowledge, skills, and abilities related to the degree programme”. During the audit, the experts learned that the internship can be prolonged if needed and that students complete internships at companies, other universities, or research institutes, depending on their interests and thesis projects. The research internship aims to allow students to use resources and facilities outside Auezov University and is assessed also by a supervisor from the external institution. Industry representatives confirmed that students apply directly to companies or partner institutions, that companies limit the number of interns because they provide individual supervision, and that students are guided by industry professionals during their internships. The students confirmed that internships are mandatory, usually take place during the holidays,

are connected to their interests and thesis topics, and require an internship report and certificate.

During the previous accreditation procedure, the level and scientific depth of the Master's theses had been a point of concern. In particular, the previous expert panel had criticised that the difference between Bachelor's and Master's theses was not sufficiently clear and that the scientific engagement with the thesis topic appeared to play a subordinate role. During the current onsite visit, the experts therefore paid particular attention to the role of the thesis and the research components in the curriculum. They learned that students receive a supervisor already in the first semester and develop their research topic within the supervisor's research direction. The teaching staff explained that students follow a clear and approved plan covering the different steps of the thesis project, including research, laboratory work, writing, and preparation for the final defence. The experts also learned that research work is embedded in several credited curriculum elements throughout the four semesters, so that the thesis is not treated as an isolated final assignment but as the culmination of a structured research process. Based on these explanations and the reviewed theses, the experts consider that the programmes have strengthened the research orientation of the Master's thesis and that the curricular structure is now better suited to support students in achieving the intended Master-level research competences.

However, the discussions also revealed several areas where the curriculum could be further developed to ensure the future-readiness of graduates. First, the experts discussed the integration of future-oriented energy topics and see further room to include renewable energies, energy transition, sustainability, hydrogen technologies, or other emerging energy technologies more systematically in the curricula.

Second, the experts discussed the use of industry-relevant software. Teaching staff reported that they use MATLAB and CHEMCAD. However, the experts specifically asked about widely used industrial simulation platforms such as Aspen Plus, Aspen HYSYS, EDR, FLARE, or comparable tools, and the discussions did not show that these tools are systematically applied in teaching. Since such software is widely used and highly relevant for industrial chemical engineering and process simulation, the experts strongly recommend strengthening the practical application of such industry-relevant software tools in the curriculum to adequately prepare graduates for modern engineering practice and the international job market.

Third, the experts discussed the role of economic and business-related competences. Teaching staff explained that students conduct economic calculations at the end of the thesis, for example regarding cost analysis, output, sales prices, and market potential. The experts acknowledge this as a useful element, especially in view of the programmes' strong

industry orientation. However, they consider that economic aspects relevant to the professional field of graduates should not only appear as an annex to thesis work but should be more systematically embedded in the curriculum as graduates who later work in production organisation, enterprise management, technological design, R&D, or industrial project implementation need to understand economic feasibility, cost structures, resource efficiency, and basic business planning.

Overall, the experts find that the programme curricula are equivalent to comparable European master's programmes in those disciplines.

Internationalisation and student mobility

According to the SAR, Auezov University has several academic exchange agreements with 56 Kazakh universities and 49 foreign universities. The SAR also states that students can do a semester-long exchange at one of those universities and there are regulations in place for the recognition of externally acquired credits (app. 13-01). However, as the submitted statistics indicate, in the past five years, no students of the CTIS nor the CTOS programme have studied abroad for an entire semester. Students seem to only engage in short summer/winter schools or placements at other universities that merely last 72 to 90 hours (app. 10-01 and 10-02). Nevertheless, the experts acknowledge that the university provides a basic framework for mobility and the onside visit has shown that students are generally aware of mobility opportunities.

To increase student mobility, the university is offering free TOEFL preparatory courses to increase the English proficiency of its students and qualify them for exchange semesters. The experts agree with the university that this is a necessary measure, but programme coordinators stated that currently no students appear to take the TOEFL course and students mentioned lack of time or a preference for IELTS as reasons. Considering the importance of English for academic mobility, access to international literature, scientific communication, and professional work in an increasingly international chemical industry, the experts recommend further supporting the development of students' English-language skills, especially technical and discipline-specific English.

Periodic review

As outlined in the Self-Assessment Report, both programmes are reviewed annually (see app. 08-03 and 02-03). The Academic Quality Committees are tasked with programme development and improvement through surveys, stakeholder interaction, and self-assessments. The Committees are made up of "experienced teaching staff, employers, students of the faculty/higher school, and representatives of the Department of Academic Affairs" (app. 02-03). As the programme coordinators confirm during the on-site visit, students and

industry feedback is taken into account in the regular review of the curricula. The experts learned that teachers can suggest topics to the department, that these proposals are discussed at departmental level, and that students are also asked about their interests when curriculum offers are planned. Industry representatives further confirmed that they participate in the regular review of the programmes and provide feedback on industry trends and developments, including through a questionnaire twice per year.

In summary, the experts confirm that the curricula of both programmes are well structured, research-oriented, connected to industry needs, and generally suitable for enabling students to achieve the intended learning outcomes. Practical and research components are integrated into the programmes, and students can set individual focus points through electives. However, the experts recommend further strengthening industry-relevant simulation software, economic competences, future-oriented energy and sustainability topics, and technical English in order to further enhance the future-readiness and international profile of the programmes.

Criterion 1.4 Admission Requirements

Evidence:

- Self-Assessment Report
- Admissions Committee website: https://priem.auezov.edu.kz/kk
- Admission rules for higher education programmes (app. 11-01)
- Procedure for transfer, reinstatement, expulsion of students and granting academic leave (app. 11-02)
- Admission Rate Statistics (app. 12)
- Regulation on the recognition of learning outcomes (app. 13-01)
- Regulation on the procedure for recognizing learning outcomes (app. 13-02)
- Statistics on Academic Success (app. 16)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:

As regulated in the admission guidelines (app. 11-01), the Admission Commission is responsible for administering the student selection and admission procedures which are regulated by the Minister of Education and Science of the Republic of Kazakhstan and in accordance with its Model Rules for Admission to Educational Organizations Implementing Higher and Postgraduate Degree programmes. Moreover, the university has developed rules for transfers, reinstatement, academic leave, and recognition of academic achievements (app. 11-

02). According to the Ministry's regulations, all applicants to a Master's programme "must pass a comprehensive test for groups of degree programmes, consisting of a foreign language test, a test on the profile of a group of degree programmes, and a test to determine readiness for study". Applicants to a Master's programme must have a Bachelor's degree and will be admitted based on the result of their entrance exam. International applicants have to do an interview with the Admission Commission.

In appendix 12, the university provides the following numbers on enrolment:

Table 5. Data on the enrollment of master's students in DP 7M07162 Chemical technology of inorganic substances

Well	Academic year	Number of applicants	Total admission of master's students	Admission of Master's students to a grant
1	2025-2026	8	3	3
2	2024-2025	11	2	2
3	2023-2024	9	1	1
4	2022-2023	8	3	1
5	2021-2022	5	4	1
6	2020-2021	5	3	3

Table 6. Data on the enrollment of master's students in DP 7M07170 Chemical technology of organic substances

Well	Academic year	Number of applicants	Total admission of master's students	Admission of Master's students to a grant
1	2025-2026	9	6	5
2	2024-2025	2	2	2
3	2023-2024	6	6	6
4	2022-2023	0	0	0
5	2021-2022	0	0	0
	2020-2021	5	5	2

Regarding limitations in the numbers of students that can be admitted, the university states the following: "The maximum number of students that can be accepted is not limited by the budget, but may be limited by the number of faculty members with academic degrees who meet the qualification requirements of the Ministry of Science and Higher Education of the Republic of Kazakhstan. Faculty members in the Department of Technology of Inorganic and Petrochemical Productions can accept a maximum of 25 master's students." In practice, however, as indicated in the introduction of the SAR, the university has set a maximum of 10 students for each programme.

Based on the discussions during the onsite visit, the experts do not see an actual capacity problem at present, as the programmes are currently characterised by low student numbers rather than by admission pressure. During the onsite visit, the programme coordinators explained that low student numbers in chemical technology are a similar issue at other

Kazakh universities. According to their explanation, a bottleneck already exists at Bachelor level: previously, students needed Chemistry and Physics as their high-school profile to take the entrance exam, which led to low Bachelor numbers and, consequently, to an even smaller pool of potential Master applicants. The programme coordinators stated that a recent governmental change now allows the high-school profile combination Chemistry and Biology, which the university expects to be more popular and therefore potentially beneficial for future recruitment. The experts acknowledge these external reasons, but at the same time, the low admission numbers raise questions regarding the long-term sustainability of the programmes. During the discussion with the rectorate and management, the university stated that it aims to increase student numbers. However, the experts could not identify a sufficiently concrete strategy, target value, or systematic gap analysis explaining why the numbers remain low and which specific measures will be taken to increase applications. The experts consider this particularly important because industry representatives clearly stated during the onsite visit that there is a strong and growing need for more graduates. They explained that the chemical, refinery, phosphorous, production, and related sectors are developing and expanding and therefore require a growing qualified workforce.

The experts further learned that, between 2015 and 2018, around 60 students were admitted as part of an industry project in which they were specifically trained for industry work. This indicates that student numbers may strongly depend on available industry grants and targeted cooperation schemes. Government grants and student scholarships currently appear to enable the continuation of the programmes despite small cohorts. While this demonstrates that the programmes are supported by external funding mechanisms, it also shows that the university should not rely solely on such grants but should develop a more systematic recruitment strategy.

Regarding the recognition of externally acquired academic qualifications, the university has regulations in place (app. 13-01 and 13-02), which regulate the transfer of credits earned at other educational institutions. The experts confirm that these regulations provide a basis for student mobility and transfer between institutions without jeopardising the achievement of the intended learning outcomes.

In summary, the experts confirm that Auezov University’s admission requirements and regulations are binding, transparent, and generally ensure sufficient prior qualification of the students. However, due to the persistently low admission numbers, particularly in light of strong labour-market demand, the experts recommend analysing the reasons for low student recruitment and developing concrete measures to increase enrolment.

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report
- Module handbook of each study programme (app. 09-01 and 09-02)
- Workload verification procedure (app. 14)
- Re-submitted student handbook
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:

To monitor and quantify the student workload, the university uses Kazakhstani credits which correspond to ECTS, meaning that 1 Kazakh credit is 30 academic hours and therefore corresponds to 1 ECTS. Both programmes have a regular full-time study duration of 2 years (4 semesters) with an annual workload of 60 ECTS, totalling 120 ECTS for a Master's degree. As the experts confirm, the programme-specific content of both programmes meets the minimum requirement of an equivalent of at least 60 ECTS credits for a Master's degree. The workload takes into account all student learning activities, "including classroom and independent work, professional practice, and preparation and defense of the final thesis".

During the onsite visit, the experts discussed the university's workload calculation in detail, as the initially submitted version of the student handbook (app. 01) appeared not to be fully coherent with the ASIIN understanding of workload. In the submitted version, Auezov University defined the academic hour as follows: "Academic hour equals one contact hour (50 minutes) for lectures, practical (seminar) classes, or two contact hours (100 minutes) for laboratory classes and physical education, as well as one contact hour (50 minutes) for all types of educational practice, and five contact hours (250 minutes) for all types of industrial practice". The experts considered this formulation unclear, because the definition seemed to vary depending on the type of learning activity and therefore raised questions as to whether one credit point consistently represents the same amount of student workload across all types of modules. In the additional meeting with the programme coordinators, the experts learned that the initially submitted student handbook was apparently outdated. The university therefore submitted the correct, current version of the student handbook as additional documentation, particularly to clarify the length and calculation of the academic hour. In the current version, the academic hour is defined as "a unit of instruction equal to 50 minutes, used for scheduling classes, calculating academic workload, and recording instructional activities", regardless of the type of class. The experts appreciate this resubmission, as it clarifies the initial inconsistency and confirms that the workload

calculation is based on a coherent understanding of the academic hour. Therefore, the experts consider this issue resolved and do not derive a requirement or recommendation from it.

The experts also discussed the overall workload with the students which they described as balanced and manageable. Regarding the workload connected to the final thesis, the documented workload for the final project initially appeared very high. During the audit, however, the teaching staff explained that thesis-related work is not concentrated only in the final semester, as discussed above. The experts therefore understand that the workload connected to the thesis is distributed over the duration of the programme and is not an isolated workload peak at the end of the studies.

Workload verifications are conducted through “educational documentation and student surveys” after each course, according to the SAR. If these instruments indicate that the calculated workload does not reflect the actual workload, adjustments are made. The experts positively acknowledge that students are involved in the monitoring of workload through regular surveys.

In summary, the experts confirm that Auezov University employs a workload-based credit system that incorporates both structured and independent study load. The workload generally appears to be realistic and reasonably distributed. The initially unclear definition of the academic hour was resolved through the submission of the current student handbook.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Module handbook of each study programme (app. 09-01 and 09-02)
- Organization and implementation of research (experimental) work of master’s and doctoral students (app. 10-05)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:

According to the SAR, teaching methods in both programmes include “both interactive and traditional forms of instruction”, such as problem-based learning, discussions, lecture-conferences, business games, lectures with presentations, practical classes with situational tasks, group projects and analyses of chemical productions and compositions. Moreover, students engage in research-oriented laboratory work, the abovementioned internships, and independent work assignments to deepen their theoretical knowledge and practically apply what they have learned. The SAR emphasized the role of the research modules in

every semester through which students learn how to solve scientific problems, including "identifying and formulating relevant scientific problems; searching, collecting, processing, analyzing, and systematizing information related to the research topic; developing methods and tools for conducting research and analyzing results; evaluating and interpreting research findings; [and] preparing reviews, reports, and scientific publications". In this regard, the SAR explicitly mentions how students of the CTIS programme "consistently achieved top positions in the national competition for scientific research in "Chemical Technology" and in startup project competitions related to their research topics". The experts consider this a positive indication that students are actively encouraged to apply their research competences beyond regular coursework, and that research-oriented teaching is effectively implemented in this programme.

The experts could confirm that the teaching methods used for each course/module are transparently stated in the module descriptions. During the onsite visit, the experts discussed the terminology used in the module handbooks with students and teaching staff, as some terms required clarification. Students explained that "guided independent work" refers to work together with the teacher, "intermediate work" is similar to a mid-term exam, and "current work" refers to self-study. Teaching staff confirmed this understanding and specified that "current independent work" means self-study, "intermediate control" means exam preparation, and "guided independent work" refers to mandatory teaching hours during which teachers work with students through consultations, office hours, and arranged meetings or work time. The experts appreciate these clarifications, as they show that the programmes include a structured balance of contact hours, guided learning, and independent study.

Regarding the ongoing evaluation of the teaching methods, the university states that the teaching effectiveness is assessed through "quality assessment at the departmental and school level via peer observations and open lectures; student surveys to provide feedback on teaching quality and the organization of the educational process; analysis of academic performance and learning outcomes to identify weaknesses and implement corrections; discussion of teaching methods in departmental meetings and the adoption of innovative approaches; involvement of external experts to evaluate degree programmes and ensure alignment with contemporary labor market requirements". During the onsite visit, teaching staff confirmed that student surveys are used to evaluate teachers and programmes/courses, as discussed above, while teachers themselves evaluate resources, administration, and related framework conditions.

A central point of discussion, not only from a curriculum point of view, as discussed above in Criterion 1.3, but also from a didactic perspective, concerned English-language skills. Technical English enables students to access international scientific literature, participate

in English-medium courses and mobility schemes, present research results internationally, prepare English-language summaries or publications, and communicate in professional contexts. This is particularly important in research-oriented Master's programmes, where students are expected to engage with current international research and present their own findings in academically appropriate formats. Therefore, the experts recommend further supporting the development of students' English-language skills, especially technical and discipline-specific English.

In summary, the experts confirm that both programmes employ a variety of teaching methods and didactic means that support student-centred learning, practical application, and the development of independent scientific work. The structured use of research modules, laboratory work, internships, guided independent work, and thesis supervision is suitable for achieving the intended learning outcomes. However, in order to further strengthen the international and research-oriented profile of the programmes, the experts recommend further supporting students' technical and discipline-specific English-language skills.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 1:

The experts assess the criterion as partially fulfilled.

Criterion 1.1

In its statement, the university addresses the room for improvement in terms of transparent availability of the learning outcomes for all stakeholders. M. Auezov University states its commitment to making the links to the learning outcomes more visible on the programme website, in brochures, and other programme materials, as well as increasing the visibility of the English-language page for international stakeholders. The experts welcome these planned measures. Until they are implemented, the experts maintain the requirement to make the learning outcomes available to all stakeholders (A 1).

Criterion 1.3

Regarding strengthening the use of industry-relevant software, M. Auezov University states that Aspen has been included into the courses "Mathematical Planning and Processing Experimental Results" (CTIS) and "Modeling of chemical and technological processes of oil refining", "Digital technologies for design and analysis of petrochemical production facilities", and "Selected chapters of Petrochemistry" (CTOS) – some of them elective courses. The learning outcomes have been revised accordingly which is reflected in the updated module handbooks that the university submitted. The experts welcome the inclusion of Aspen into the curriculum. However, they want to point out to the university that since

some of the courses listed above are electives, the level of practical exposure to Aspen may differ among students. The experts suggest keeping this aspect in mind in the further development of the programmes, so that all graduates have sufficient practical exposure to industry-relevant process simulation software. Nevertheless, the experts no longer see the need for a corresponding recommendation to strengthen the practical application of industry-relevant software tools, such as Aspen Plus, Aspen HYSYS, or comparable simulation software, in the curriculum.

Regarding the inclusion of economic aspects into the curriculum, M. Auezov University states that such content is already taught in a number of courses. Nevertheless, the university has added economic components in the revision of several courses in both programmes. The experts welcome these measures and no longer consider a corresponding recommendation necessary.

Regarding the inclusion of future-oriented energy topics into the curriculum, M. Auezov also lists a number of courses that have been revised to include topics such as renewable energies, energy transition, sustainability, and emerging technologies. The experts welcome these measures and no longer consider a corresponding recommendation necessary.

Criterion 1.4

Regarding the experts' recommendation to analyse the reasons for the low admission numbers, the university states that several measures have already been taken. For once, recent changes in national admission policies will allow for a greater applicant pool in the near future. Moreover, M. Auezov University is also implementing additional recruitment measures, specifically targeting final-year bachelor students. Also, the university is planning to intensify collaboration with chemical industry companies to attract engineers who seek further training via a master's degree. The experts positively acknowledge the university's commitment and targeted measures which exceed the recommendation and no longer consider a corresponding recommendation necessary. Nevertheless, the experts stress that in the future, M. Auezov University should follow up and asses whether the measures have been successful.

Criterion 1.6

Regarding the recommendation to further support the development of students' English language skills, M. Auezov University states that it sees the primary instance of where to change something in the teaching staff's English skills and therefore implemented a KPI system and free language courses for teaching staff. While experts see this as a good first step, they reiterate the need let students engage with international literature and be proficient in the use of technical terminology in English. To further encourage the measures

that M. Auezov University is already taking, the experts maintain their recommendation to further support the development of students' English language skills, especially technical/discipline-specific English (E 1).

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- Self-Assessment Report
- Module handbook of each study programme (app. 09-01 and 09-02)
- Academic Policy (app. 24-01)
- Examination regulations (app. 17-01 and 17-02)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
According to the SAR, assessment methods in both programmes include "continuous assessment (student performance in laboratory and practical classes, evaluation of independent work), milestone assessments (tests after completion of specific modules), intermediate assessments (exams), and final assessments (preparation and defence of the final thesis or comprehensive examination)". Exams can be written, oral, or in test format. The milestone assessments can be written assignments, tests, or colloquia and are conducted twice a semester. Exam forms and periods are specified in the syllabi and scheduled beforehand which was confirmed by the students during the onsite visit. The students stated that exams are generally organised well, that they have sufficient time to prepare, and that they are informed about exam dates in due time. They also explained that students apparently have a say in the scheduling of exams, which the experts positively acknowledge as a student-oriented element of exam organisation.

The university has regulations in place for absences, resits/retakes, and appeals procedures. There are also regulations in place for "Students with Special Educational Needs (SEN)". Moreover, an antiplagiarism system is used for all written assignments. During the onsite visit, the students confirmed that the rules for resits are clear to them.

Regarding the grading criteria, Auezov University states that the final exam accounts for 40% of the total grade, and 60% is made up of assessments during the semester. The following grading scale is applied:

Grade in letters	Points in numbers	Percentage	Criteria for knowledge assessment
A	4,0	95-100	excellent
A-	3,67	90-94	
B+	3,33	85-89	good
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	satisfactory
C-	1,67	60-64	
D+	1,33	55-59	
D	1,0	50-54	
F	0	0-49	unsatisfactory

While the module descriptions list the individual types of examination used in a given course, they do not consistently contain information on the make-up of the final grade, i.e. the weighting of the final exam, assignments, tests, discussions, or other assessment components. This is particularly relevant for the assessment formats of “collective discussions” (discussion-based formats) and “differentiated credit”, which appear in the curriculum and module descriptions. During the onsite visit, the programme coordinators explained that “differentiated credit” is the form of final examination for research projects and internships and usually consists of a report and oral defence. The experts consider this explanation plausible, but stress that this information must be clearly stated in the module descriptions so that the examination requirements are transparent not only in the syllabi, of which examples were handed to the experts, but also in the official module documentation. This point is further addressed under Criterion 4.1, since it primarily concerns the completeness and transparency of the module descriptions.

In summary, the experts confirm that both programmes use a variety of module-related examination forms that are generally suitable for assessing whether students achieve the intended learning outcomes. Examination organisation, resit rules, thesis supervision, and grading procedures are transparent to students in practice. While the formal module descriptions must more clearly specify assessment components, their weighting, and the requirements for “differentiated credit”, this issue is further addressed under Criterion 4.1.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 2:

The experts assess the criterion as fully fulfilled.

As the experts’ comment regarding the specification of requirements for “differentiated credit” as well as the universities statement thereof is further discussed under criterion 4.1, the experts see no need for a requirement or recommendation under criterion 2.

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Self-Assessment Report
- Staff handbooks (app. 19)
- Student surveys and results (app. 22)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:

Auezov University provides the following information on the staff working in the CTIS programme:

Academic Year	Doctor of Science, Professor	Candidate of Science, Associate Professor	PhD	Total Teaching Staff
2020-2021	7	9	4	20
2021-2022	7	9	3	19
2022-2023	5	8	2	15
2023-2024	4	8	2	14
2024-2025	3	8	2	13
2025-2026	4	7	3	14

Moreover, the following data is presented for the CTOS programme:

Academic Year	Doctor of Science, Professor	Candidate of Science, Associate Professor	PhD	Total
2020-2021	3	9	4	16
2021-2022	3	9	3	15
2022-2023	3	8	3	14
2023-2024	3	8	3	14
2024-2025	3	6	5	14
2025-2026	3	6	5	14

According to the SAR, the staffing of both programmes is based on national qualification requirements and institutional workload planning. For Master's degree programmes, the teacher-to-student ratio is set at 1:6. The teaching workload of an academic staff member amounts to 680 hours per academic year, of which up to 50% may consist of extracurricular or non-classroom activities. Regular monitoring of teaching workloads and staffing levels is carried out by the Department of Academic Affairs in cooperation with the heads of departments. If necessary, visiting lecturers and external experts are engaged. This was also

confirmed during the onsite discussions, where the programme coordinators confirmed the staff workload and that is divided roughly equally between teaching and other tasks.

The experts confirm that the staff involved in the two programmes is generally suitable in terms of composition, academic qualification, professional orientation, and research experience. Both programmes are located within a Higher School, where doctoral programmes are also offered. This institutional embedding supports the research orientation of the Master's programmes, as academic staff are involved not only in teaching but also in research, doctoral supervision, and cooperation with external partners.

The SAR as well as the onsite discussions confirm that staff members have relevant industry and research experience. At rectorate level, the university explained that it recruits staff from local industry and emphasised its unique regional position and attractiveness for researchers. Programme coordinators and teaching staff further confirmed that academic staff have industry experience and that external lecturers from industry are employed, especially for practical courses. These external lecturers receive training and are also subject to student evaluations. The experts positively acknowledge this close involvement of industry-experienced staff, as it supports the professional relevance and application orientation of the programmes.

Regarding continuous professional development, the university states that staff development is organised through annual training plans. During the onsite discussions, teaching staff reported that the university offers various free-of-charge courses, including foreign-language courses, AI-related courses, and disciplinary training. Staff can also engage in international research contacts through internships, and the experts learned that the university provides grants, especially for younger staff members, for mobility projects through which they can further enhance their academic and professional skills. At the same time, the discussions showed that personal development is often additional and voluntary on top of teaching, research work, projects, grant applications, and administrative duties. Teaching staff described their workload as demanding, and professional development therefore appears to depend strongly on individual initiative and available time. While the experts acknowledge that staff members are motivated and that development offers exist, they see room for improvement in making staff development more systematic and more strongly aligned with the strategic goals of the programmes. This is particularly relevant in the areas of English-medium teaching and internationalisation. As discussed under Criteria 1.3 and 1.6, the experts recommend further supporting students' technical and discipline-specific English-language skills. This objective can only be achieved sustainably if teaching staff are also supported in developing their own English-medium teaching competences and their ability to work with international literature, international teaching formats, and international academic partners.

The university also has mechanisms for staff evaluation and teaching quality assurance. Student surveys evaluate teachers and programmes/courses, while teachers themselves evaluate resources, administration, salary, and related framework conditions, as discussed above. A monitoring department considers this feedback and may forward relevant issues to the education council. External lecturers are also subject to student evaluation. The experts therefore confirm that staff performance and the teaching environment are regularly reviewed.

In summary, the experts confirm that the composition, professional orientation, academic qualification, industry experience, and research activities of the teaching staff are suitable for successfully delivering both programmes. The experts positively acknowledge the involvement of industry-experienced staff. However, in order to support the university's internationalisation goals and the further development of English-medium and internationally oriented teaching, the experts strongly recommend expanding staff development opportunities, particularly in the areas of English-medium teaching and internationalization.

Criterion 3.2 Student Support and Student Services

Evidence:

- Self-Assessment Report
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
The SAR describes the following types of student support: "At the admission stage – open days, online consultations; During studies – regular academic advising, access to electronic resources, academic and career support; At the final stage – preparation for thesis defense, assistance in securing internships and employment." There is also an academic advisor assigned to each student. Further support structures and administrative offices include the Institute of Postgraduate Education, the Academic Affairs Department, the Educational and Information Center, the Bologna Process and Academic Mobility Centre, the Employment Support and Competencies Centre, the Anti-Plagiarism Department, the Social Support Department, the Academic Research Department, and the Entrepreneurship and Commercialization Department.

During the onsite visit, the experts could confirm that student support is well established and known to the students. The internal expert summary highlights good student guidance and support, including academic support, support structures for students with disabilities, financial support for mobility, and psychological support. The students confirmed that they receive support from individual study advisors, for example when choosing electives and building their individual curriculum. They also stated that they can access relevant course

information through syllabi and module handbooks. This confirms that students are not left alone in navigating the elective structure of the programmes but receive both formal documentation and personal guidance.

In addition to academic advising, the university provides support structures for mobility and career development. Students confirmed during the onsite visit that information sessions on academic mobility are offered and that government scholarships and Erasmus funds are available. The experts therefore conclude that the university provides a basic support framework for mobility, even though actual semester-long mobility in the two programmes remains limited, as discussed under Criterion 1.3.

The accessibility of feedback and complaint mechanisms was also discussed with students. The students stated that they know how to provide feedback or file complaints and described the processes as clear and accessible. They referred to surveys, the role of the student rector, and the possibility of direct contact with the rector showing the experts that students are aware of institutional channels through which they can voice concerns or suggestions.

In summary, the experts confirm that Auezov University provides sufficient student support and counselling structures for both programmes. Academic advising, thesis supervision, mobility support, career-related assistance, psychological support, and accessible feedback mechanisms are available and known to students.

Criterion 3.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
The financial resources for the programmes are presented in the SAR, as copied here:

Table 14. Funding for master's degree programme 7M07162 Chemical technology of inorganic substances

Academic Year	Funds for ensuring the educational process within EP framework			Staff Salaries (KZT)
	Funding from state educational grants, (KZT)	Funds for purchase of technological equipment and devices under government procurement, (KZT)	Technological equipment purchased through grant funding for research projects and sponsorship from partners, tenge (KZT)	
2020/2021	1,188,000.00	297 000,00	0,00	891,000.00
2021/2022	396,000.00	5 073 069,00	750 000,00	297,000.00
2022/2023	2,184,000.00	546 000,00	16 352 333,00	1,638,000.00
2023/2024	440,175.00	110 043,75	3 550 000,00	330,131.25
2024/2025	1,364,700.00	341 175,00	6 797 545,00	1,023,525.00
Total	**5,572,875.00**	**6 367 287,75**	**27 449 878**	**4,179,656.25**

Table 15. Funding for master's degree programme 7M07170 Chemical technology of inorganic substances

Academic Year	Funds for ensuring the educational process within EP framework			Staff Salaries (KZT)
	Funding from state educational grants, (KZT)	Funds for purchase of technological equipment and devices under government procurement, (KZT)	Technological equipment purchased through grant funding for research projects and sponsorship from partners, tenge (KZT)	
2020/2021	2,772,000.00	693 000,00	0,00	2,079,000.00
2021/2022	1,980,000.00	495 000,00	0,00	1,485,000.00
2022/2023	0.00	0,00	2 038 703	0.00
2023/2024	2,641,050.00	660 262,50	6 818 489	1,980,787.50
2024/2025	3,639,200.00	341 175,00	0,00	7,729,400.00
Total	**11,032,250.00**	**2 758062,50**	**8 857 192**	**8,274,187.50**

These tables indicate different funding sources and budget lines for teaching, staff, infrastructure, and research-related activities. During the onsite visit, the rectorate explained that the university's funding is composed of several sources: government funds, whose use is regulated by the Science Law; enterprise funds; internal grants; and, in some cases, local government funds for projects that are expected to have an impact on regional industry or infrastructure. The experts understand from the discussions that this mixed funding structure explains some of the variation in the annual funding figures, as equipment upgrades and research activities may depend on project-based grants or fixed project durations.

During the onsite discussions, the programme coordinators described the available funding as sufficient in light of the currently low number of students. The rectorate further reported plans to update certain laboratory equipment and referred to national and regional government funds announced for the current year. The experts also learned that industry

funds currently account for approximately 10% of the university's funding, with the university aiming to increase this share to 20%. Close cooperation with local companies and other regional industrial partners was highlighted in this context. The experts positively acknowledge this ambition, particularly because the programmes are closely linked to regional industrial needs and because industry representatives confirmed the high demand for qualified graduates.

Regarding equipment and infrastructure, the experts paid particular attention to developments since the previous accreditation procedure. In the last accreditation report, the expert panel had criticised that there had been very little laboratory modernisation and that laboratory safety standards were still below international standards. Concerns had included missing emergency showers and eye showers, unclear availability of storage containers for protective goggles, insufficient use or suitability of gloves and respiratory protection, incomplete labelling of hazardous substances according to international standards, problematic distances between sockets and sinks, and unclear chemical waste disposal infrastructure. The previous panel had therefore asked the university to provide safety and disposal concepts, including responsibilities and intervals for safety training.

In the current procedure, the experts observed significant improvements in this area. The internal expert summary explicitly highlights improvements in laboratory and analytical equipment, safety regulations, safety equipment, and library facilities. During the onsite discussions, the university reported that special containers, emergency showers, and updated regulations on waste and safety had been introduced since the previous accreditation. Laboratory safety regulations and standards were also described as having been established or updated. The experts therefore acknowledge that the university has responded to the previous criticism and has made visible progress regarding laboratory safety and equipment.

The experts also reflected on the research environment of the programmes. Since Auezov University has recently become a research university, research activities, doctoral education, grant acquisition, and publication output have become increasingly important for the institutional profile. Staff members reported that they are encouraged to publish in internationally recognized journals. Staff members also participate in research competitions, and national funding competitions may support publication activities. At the same time, teaching staff were asked about the competitiveness of research funding and the possibilities for obtaining third-party funding. The experts gained the impression that the research environment is developing positively but could be further strengthened, especially through more systematic third-party funding and stronger support for staff publications in international journals.

In summary, the experts confirm that the available financial resources, laboratory infrastructure, analytical equipment, and external cooperation structures constitute a sustainable basis for delivering both programmes. The experts positively acknowledge the considerable improvements in laboratory safety and equipment since the previous accreditation. To further support the university's research profile and the research-oriented character of the programmes, the experts recommend strengthening the research environment, particularly through increased third-party funding and improved opportunities for international publication.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 3:

The experts assess the criterion as substantially fulfilled.

Criterion 3.1

Regarding the experts' recommendation to expand staff development opportunities, particularly in the areas of English-medium teaching and internationalisation, the university refers to the abovementioned statement to criterion 1.6. The experts welcome these planned measures and to encourage their implementation, maintain their recommendation (E 2).

Criterion 3.3

Regarding the experts' recommendation to strengthen the research environment of the programmes, for example by increasing third-party funding and the possibilities for staff to publish in international journals, M. Auezov University presents an overview of government-funded research projects that its staff has taken part in, national competitions, and publications. Moreover, the university states that organises an internal grant competition for you researchers and its Center for Scientific and Analytical Information conducts trainings for staff and students on a regular basis on publishing and international standards. The experts welcome this detailed overview of the institutional structures, past and current research projects, and publications and see that M. Auezov has a supportive research environment for its staff. The experts therefore no longer see the need for a corresponding recommendation.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Self-Assessment Report
- Module handbooks (app. 09-01 and 09-02)
- Additionally submitted, exemplary course syllabi
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
In the documentation to the Self-Assessment Report, Auezov University has presented module descriptions for all modules of both programmes. These include core information such as module title, module coordinator, teaching and examination methods, learning outcomes, module contents, workload, credits, and reading lists. The module descriptions are provided in the programme documentation and, according to the SAR, are made available to students and relevant stakeholders. During the onsite visit, programme coordinators and students confirmed that the learning outcomes, syllabi, and module handbooks are available and used by students. Students further stated that they can access relevant information through the online learning management system. Regarding the accessibility of the module handbooks for other stakeholders, the university links two websites in the SAR. However, it is not clear where on the university website interested parties can find those links. Also, just as with the learning outcomes, a date in the URL suggests that the uploads have only been made available in the course of this accreditation procedure. The experts therefore conclude that the module descriptions are accessible to enrolled students, although the public visibility for external stakeholders should be presented more transparently.

Moreover, the experts identify a significant shortcoming regarding the transparency of assessment and grading information. While the module descriptions list the individual types of examination used in a given course, they do not consistently contain information on how the final grade is calculated. In particular, the weighting of the assessment components (e.g., final exam, written assignment, test, colloquium, laboratory work, discussion, oral presentation, or semester performance) is not always clearly stated. During the onsite visit, the students stated that grading criteria are available in the module handbooks and syllabi and can be accessed via the online learning management system. The experts also received a sample of an exemplary, more detailed course syllabus, which included more specific information on assessment components. This indicates that students may in practice receive the necessary information at the beginning of the course. Nevertheless, the official module

descriptions themselves must contain the relevant information, as they are the central documentation instrument for students, teaching staff, external reviewers, and interested third parties.

A further point of concern was the assessment format of "differentiated credit" which has already been discusses above in Criterion 2. During the onsite discussion, the programme coordinators explained that differentiated credit is the form of final assessment used, for example, for research projects and internships, and typically consists of a report and oral defence. The experts consider this explanation plausible. However, this information must be explicitly stated in the module descriptions, including what exactly students must submit or present, how the report and oral defence are assessed, and how both components contribute to the final mark. Without this information, students and external stakeholders cannot clearly understand the requirements for successfully completing these modules.

A further point concerns the recommended reading lists in the module descriptions. The experts note that these reading lists appear to consist mainly of publications by Auezov University staff and include comparatively few internationally recognised textbooks, current English-language literature, or relevant academic publications from the international scientific community. The experts acknowledge that publications by local staff can be relevant, especially where they reflect regional industry needs or specific research expertise. However, in research-oriented Master's programmes, students should also be systematically exposed to international standard works, current journal literature, and English-language academic sources. This is particularly important for strengthening the international profile of the programmes, supporting students' scientific writing and publication activities, and preparing them for international academic or professional contexts.

In summary, the experts confirm that the module descriptions are generally available and provide relevant information on module content, learning outcomes, teaching methods, workload, and credits. However, they must be supplemented with transparent information on the calculation of final grades, assessment components, weighting, and the requirements for differentiated credit. In addition, the experts recommend broadening and internationalising the reading lists.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Exemplary Diploma Supplement, Diploma Certificate, and Transcript of Records (appendices 06/DS-01, 06/DS-02, and 21)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
The SAR links to a diploma supplement that is accessible on a university website and submitted as app. 06/DS-01 and 06/DS-02. However, in format and in the information that it contains, this diploma supplement differs from the one submitted as app. 21-03 and 21-04. According to the SAR, students receive both versions. The experts consider this situation unclear, as it is not evident which of the documents constitutes the official diploma supplement issued to graduates and whether all graduates receive a complete diploma supplement in English that includes information on the graduate's qualification profile and individual performance as well as the classification of the degree programme within the respective education system.

In summary, the experts confirm that Auezov University has prepared diploma supplement-related documentation, but the submitted versions are not yet sufficiently clear and consistent. Therefore, the experts consider it necessary that a uniform diploma supplement is issued for all graduates.

Criterion 4.3 Relevant Rules

Evidence:

- Self-Assessment Report
- All regulations provided on the university's and programmes' websites
- Student handbook (app. 1 and resubmitted, current version)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
According to the SAR, the rights and responsibilities of the university and students are set out in several institutional documents, including the Handbook for Master's and Doctoral Students, the Code of Ethics, the Academic Integrity Rules, the Research Ethics Policy, agreements for the provision of educational services, and internal regulatory documents governing academic processes. The relevant information is published on the university website and in the online information system. The university further states that students are informed about relevant rules and procedures through Orientation Week, the official website and online information system, the student handbook (of which the experts have received the correct, current version), and consultations with academic advisors.

During the onsite visit, the students confirmed that they can easily find and access relevant information and documents online. They referred in particular to the online learning platform, syllabi, and module handbooks. Students also stated that they are familiar with the training objectives and learning outcomes of their degree programmes and know where to

find them. The experts also note positively that students receive support in understanding relevant regulations through individual academic advisors.

A point of particular relevance from the previous accreditation procedure concerned laboratory safety regulations, as already discussed in detail above. In the current procedure, the experts positively note that the university has introduced new or updated safety regulations.

In summary, the experts confirm that the relevant rights, duties, rules, and regulations are defined in institutional documents and are accessible to students through the university's digital systems, syllabi, module handbooks, orientation activities, and academic advising. The students' statements confirmed that they can find the relevant information and understand the key programme rules.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 4:

The experts assess the criterion as partially fulfilled.

Criterion 4.1

Regarding the experts' remark to increase visibility and accessibility of the module descriptions for external stakeholders via websites that have not been set up solely for the purpose of this accreditation, the university states the revised module handbooks shall be published on the university's website. As it is not clear whether this has already taken place, the experts maintain the requirement to make the module descriptions available to all stakeholders until this is fully implemented (A 2).

Regarding the identified need for clearer information in the module descriptions on assessment components, their weighting, and the requirements for receiving the "differentiated credit", M. Auezov has revised and resubmitted the module handbooks for both programmes. The experts welcome these revisions and no longer see the need for a corresponding requirement as all relevant information in now included and transparent to students.

Regarding the recommendation to internationalise the reading lists in the module handbooks, M. Auezov University states the reading lists have been reviewed and updated with internationally recognized sources. Upon review, the experts find that they now include relevant international literature and no longer see the need for a corresponding recommendation.

Criterion 4.2

Regarding the requirement to provide a uniform Diploma Supplement for all graduates as there was confusion as to which version of the submitted documents constitutes the issued Diploma Supplement, the university clarified that students receive both documents as per national regulations. The Diploma Supplement in the European format (app. 06/DS-01 and 06/DS-02) is issued by Kazakhstan higher educational institutions in accordance with State Mandatory Standard for Higher and Postgraduate Education. The supplements to the diploma supplement (app. 21-03 and 21-04) are issued in accordance with the national legislation of the Republic of Kazakhstan in three languages (Kazakh, English and Russian) as set out in an order by the Kazakh Minister of Science and Higher Education in 2023. The experts appreciate this clarification and no longer see the need for a corresponding requirement.

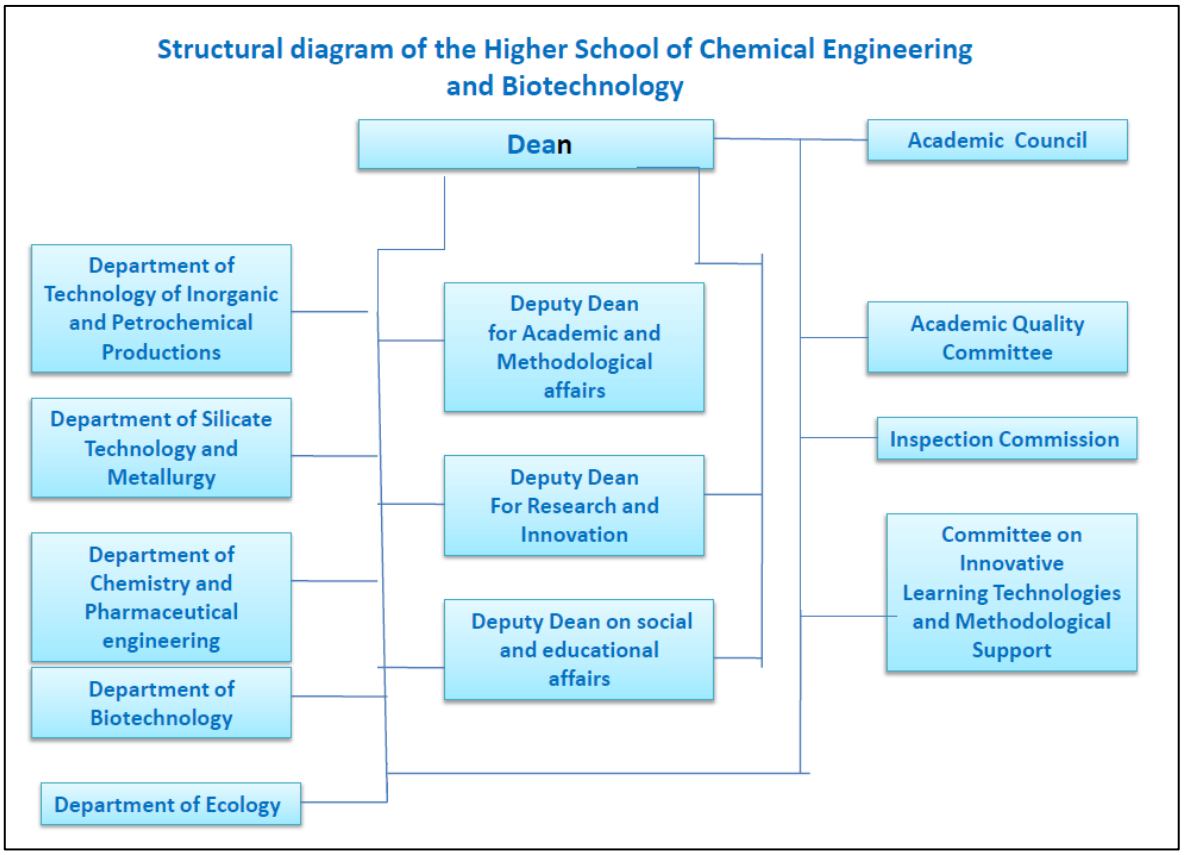
5. Quality Management: Quality Assessment and Development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Quality management handbooks (app. 02-01 – 02-05)
- Student surveys and results (appendices 22)
- Discussions during the on-site visit

Preliminary assessment and analysis of the experts:
Auezov University has implemented an internal quality assurance system, and provides the following organizational chart for the Higher School, indicating the respective responsibilities (app. 02-02):



According to the SAR, quality assurance measures are implemented both at institutional and programme level and follow a structured Plan-Do-Check-Act cycle. The SAR further explains that quality assurance and programme development have been strengthened in recent years through, among other aspects, the implementation of a learning-outcomes-based programme approach, the establishment of Academic Quality Committees, the involvement of employers and students in these committees, and the implementation of academic integrity principles, including mandatory plagiarism screening.

At rectorate level, the experts learned that the university has further developed its quality management and strategic planning system, including the use of KPIs for teaching staff and researchers. Every staff member has specific contractual requirements and responsibilities, and the university has established a bonus system for achievements such as academic and research output. The experts consider this a structured approach to linking individual staff development and institutional quality goals.

At programme level, Auezov University conducts internal and external evaluations of its study programmes. As stated in the SAR, developed degree programmes first undergo an internal evaluation by members of the Academic Quality Committee, leading faculty, and involved employers to assess compliance with relevant standards and requirements. The programmes are then submitted for external review, where independent experts and

representatives of the professional community assess their relevance and quality. This external review process was also discussed under Criterion 1.1 in relation to the learning outcomes achievement rate. The experts consider this combination of internal and external review suitable for ensuring the continued relevance and quality of the programmes.

The experts particularly appreciate the involvement of students in quality management and decision-making processes. At rectorate level, the university explained that students are represented in the scientific council and are involved in decision-making. The students also referred to the role of the student rector, who is in contact with the dean and other university instances. Students stated that their perspective is heard and that they know how to provide feedback or file a complaint. They described the feedback and complaint mechanisms as clear and transparent, referring to anonymous online surveys, student representation structures, and direct contact with the rector. Students also stated that they see results and changes based on their feedback. Teaching staff also confirmed that evaluation results are communicated to students and that improvements based on evaluation feedback are discussed. The experts see this as an important element of a closed feedback loop.

Industry partners are also systematically involved in quality assurance and programme development. During the onsite visit, industry representatives confirmed that they participate in regular programme review and are asked twice per year through questionnaires what could be improved in the programmes. They also stated that their feedback is heard and used through regular feedback circles.

Overall, the experts find that Auezov University has implemented a functioning and stakeholder-oriented quality management system. The processes include internal and external evaluation, regular student and employer feedback, student participation in decision-making, staff-related performance monitoring, and mechanisms for communicating results back to students. The onsite discussions confirmed that students, teaching staff, and industry representatives are actively involved and that feedback is used for programme development.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 5:

As the university did not address this criterion in its statement, the experts confirm their previous assessment and consider the criterion to be fully fulfilled.

D Additional Documents

No additional documents are needed.

E Comment of the Higher Education Institution

The institution provided an extensive statement as well as the following additional documents:

- Revised Module Handbook for the Ma Chemical Technology of Inorganic Substances
- Revised Module Handbook for the Ma Chemical Technology of Organic Substances

The following quotes the comment of the institution:

“M.Auezov South Kazakhstan University sincerely thanks the expert group for its comprehensive review of the programmes and respectfully presents its comments on the expert report.

Criterion 1.1 Objectives and Learning Outcomes of a Degree Programme (Intended Qualifications Profile)

Nevertheless, the experts see room for improvement in making the learning outcomes transparently available to all stakeholders.

Comment

We are pleased that the experts confirmed that enrolled students are familiar with the PLO and are able to access them through the course syllabi and module handbooks. In order to improve visibility of learning outcomes for all stakeholders the university will implement the following measures:

- make the links to PLO more visible on the programme webpages;
- add cross-links from the admissions page and faculty/department webpages;
- include hyperlinks to the learning outcomes in the electronic brochures and programme descriptions;
- make PLO accessible through QR codes in information materials and programme presentations;
- increase the visibility of the English-language pages for international stakeholders.

Criterion 1.3 Curriculum

However, the experts recommend further strengthening industry-relevant simulation software, economic competences, future-oriented energy and sustainability topics, and technical English in order to further enhance the future-readiness and international profile of the programmes.

Comment

We appreciate the experts' observation and recommendations regarding the further development of the curriculum.

Regarding industry-relevant simulation software

We would like to point out that we started using MATLAB and CHEMCAD in our classes because of what the previous accreditation review suggested. These software packages have been used to enhance student's competencies in mathematical modelling, process simulation and engineering calculations.

In response to the current recommendation, we are taking steps to expand the application of industry-standard simulation software. Specially, Aspen been included into the content of the following courses:

- **M17.2 Mathematical Planning and Processing Experimental Results** (Chemical technology of inorganic substances programme)
- **M19.1. Modeling of chemical and technological processes of oil refining, M19.2. Digital technologies for design and analysis of petrochemical production facilities, M10.1. Selected chapters of Petrochemistry** (Chemical technology of organic substances programme)

The planned learning outcomes have been revised accordingly. It is reflected in the updated module handbooks attached to the report. These alterations strengthen students' practical skills in the use of internationally recognized software, ensuring closer alignment with current industry requirements.

Regarding economic competences

Economic aspects are currently addressed through engineering courses that develop competencies in economic feasibility assessment, resource efficiency, process optimization, investment appraisal and business planning

In particular, for *Chemical technology of inorganic substances* programme, these competencies are developed in the following courses:

- **M10.2 Fertilizer Application Technologies** - practical classes include calculations of the effectiveness of fertilizers and economic feasibility of their application.
- **M16.2 Technology of Inorganic Polymers** - practical classes include calculations of economic efficiency of using secondary raw materials for the production of inorganic polymer compounds.
- **M17.1 Innovative Feed Salt Technologies** - lectures cover modern, cost-effective methods for producing mineral feed products and the corresponding standards requirements.
- **M22 Research Work of a Master Student 4** – students evaluate economic efficiency of the developed technological solutions as an integral part of their research projects.
- **M5.1 Design of Chemical Productions** – students determine optimal production parameters based on engineering calculations that facilitate the efficient use of production resources.
- **M 5.2 Statistical Methods for Processing Scientific Data** - the course covers optimality criteria, objective function, and optimization resources, providing a methodological basis for technically and economically sound engineering solutions.

Following the recommendations of experts, the economic component of the programme has been developed through the revision of two courses:

M5.1 Design of Chemical Productions has been supplemented with new lecture and practice classes topics covering technical and economic assessment of chemical technologies, structure of structural and economic costs, analysis of resource, energy, and equipment efficiency. Fundamentals of business planning for successful technology projects, assessment of investment attractiveness, results of commercialization of research and development (R&D) and innovation management in the chemical industry.

M13.1 Innovative Technologies of Available Phosphates and Nitrates has been supplemented with topics covering design and management of research and development (R&D) and investment projects, feasibility study of innovative solutions, analysis of efficiency and risks, development of rational schemes.

Chemical technology of organic substances programme also integrates economic aspects through several engineering courses:

- **M6. 1 Nanostructured polymer materials** examines the environmental and economic aspects of nanostructured polymer technologies.

- **M6. 2 Ways to intensify the production and processing of elastomers** include an evaluation and comparison of economic efficiency of various methods of production and processing elastomers.
- **M9. 1 Advanced technologies of petrochemical synthesis** include environmental and economic assessment of the process of synthetic rubber production process flowsheets.
- **M10.1. Selected chapters of Petrochemistry** cover the development of a business plan for the implementation of innovative technologies in the petrochemical industry: market analysis and competitive environment; assessment of investment costs and operating expenses; calculation of project economic efficiency indicators (NPV, IRR, Payback period).
- **M19.2. Digital technologies for design and analysis of petrochemical production facilities** integrate cost effectiveness and sustainability of production.

According to the experts' recommendations, the economic component has also been strengthened through the revision of following courses:

M5.1 Resource-saving technologies has been expanded by **t**echnical and economic assessment of resource-saving technologies, analysis of resource, energy, and equipment efficiency, cost structure, business planning principles, investment attractiveness assessment, commercialization of research and development (R&D) and innovation management.

M5.2 Prospects for the development of the production of motor fuels from hydrocarbon raw has been supplemented with the topics covering environmental, economic, and technological aspects, product life cycle assessment, principles of sustainable development of motor fuel production, design, management of research and development (R&D) and investment projects, feasibility study for innovative technologies, efficiency and risks, development of rational schemes for processing hydrocarbon and renewable raw materials.

Therefore, economic considerations are embedded into both programmes through existing engineering courses and have been additionally strengthened by curriculum revisions. As a result, students develop enhanced competencies in economic feasibility assessment, resource and energy efficiency, process optimization, investment analysis, business planning, sustainable development, and the technical and economic evaluation of engineering solutions.

Regarding future-oriented energy and sustainability topics

In response to this recommendation, both programmes have been revised to strengthen the sustainability and future-oriented energy components through updating existing courses (See revised Module Handbooks).

For *Chemical technology of inorganic substances* programme the content of following courses was supplemented.

M12.1 Energy Efficient Technologies of Mineral Acids – by topics in energy transition and decarbonization pathways in the chemical industry, low-carbon and green hydrogen technologies for sustainable ammonia production, integration of renewable energy sources into mineral acid and fertilizer production processes.

M20.1 Actual Problems of Electrochemical Technology – by topics in electrochemical technologies for green hydrogen production and energy storage, renewable electricity in electrochemical processes and Power-to-X technologies, emerging electrochemical technologies for the low-carbon transition of the chemical industry.

M18.1 Resource Saving Technologies of Technogenic Waste Processing – by topics in **c**ircular economy and resource recovery for sustainable chemical production, waste-to-energy technologies and recovery of secondary energy resources, resource-efficient technologies supporting the low-carbon transition of the chemical industry.

For *Chemical technology of organic substances* programme the sustainability and energy transition component has been strengthened through the revision of two courses.

M5.1 Resource-saving technologies

Resource-saving concepts in the chemical industry: waste minimization principles, closed production cycles, a circular economy, and improved efficiency in the use of material, public, and water resources. Current trends are reducing the development of the chemical industry; ESG principles and low-carbon production transformation are being implemented. Analysis and optimization of material and flow streams, application of catalytic, membrane, and sorption technologies, integrated resource utilization. Integration of renewable energy systems and hydrogen technologies for sustainable chemical manufacturing. Recycling and disposal of chemical production waste. Application of low-carbon and resource-efficient technologies in chemical production. Digital energy management systems. Development of new catalysts and process flow diagrams, implementation of innovations, product life cycle assessment (LCA), carbon footprint, and, consequently, efficiency. Design and management of resource-efficient production facilities. Technical and economic assessment of resource-saving technologies, structure of structural and economic costs, analysis of resource, energy, and equipment efficiency. Fundamentals of business planning for successful technology projects, assessment of investment attractiveness, results of

commercialization of research and development (R&D) and innovation management in the chemical industry. Environmental safety in resource conservation. International and safety standards are consistent with the development, environmental standards, and energy efficiency of industrial enterprises.

M5.2 Prospects for the development of the production of motor fuels from hydrocarbon raw

The modern fuel industry in the context of global trends in the production and consumption of motor fuels, the role of oil and gas in the energy balance, energy transition, decarbonization, and climate policy. Prospects for the development of low-carbon energy sources, including biofuels, synthetic fuels, hydrogen, and renewable energy sources. Properties and requirements for modern and promising motor fuels. Technologies for deep oil and gas refining, digitalization, energy efficiency, and the integration of traditional and innovative processes. Analysis of gasoline, diesel, and aviation fuel production technologies, as well as GTL, CTL, BTL, Power-to-Liquid, hydrogen technologies, and CCUS. Environmental, economic, and technological aspects, product life cycle assessment, principles of sustainable development of motor fuel production. Design, management of research and development (R&D) and investment projects, feasibility study of innovative solutions in the production of motor fuels. Analysis of efficiency and risks, development of rational schemes for processing hydrocarbon and renewable raw materials.

Criterion 1.4 Admission Requirements

However, due to the persistently low admission numbers, particularly in light of strong labour-market demand, the experts recommend analysing the reasons for low student recruitment and developing concrete measures to increase enrolment.

Comment

We recognize that increasing student numbers requires a systematic and targeted recruitment strategy. As a first step, an important external barrier to admission has already been removed. In line with recent changes to national admission policy, updated entrance examination requirements have been adopted for bachelor programmes, allowing applicants, in addition to the previously established requirements, to take a combination of chemistry and biology. This measure is expected to broaden the pool of potential applicants and increase bachelor students' enrollment, thereby strengthening the future pipeline of candidates for master programmes.

Following the initial step, the university is on the way of implementation of additional recruitment measures aimed at clearly defined target groups. Specifically, greater attention is paid to attracting final-year bachelor students by providing information about the academic and career opportunities offered by master programmes, organizing promotional events, and strengthening academic advising to encourage continuation of studies at the master's level.

Furthermore, we are in the process of intensifying collaboration with chemical industry enterprises of south Kazakhstan to attract practicing engineers and technical specialists seeking advanced training. This includes targeted information campaigns, collaboration with industrial partners, and promoting the programmes as opportunities for professional development and career advancement.

These measures are expected to contribute to the long-term sustainability of both programmes.

Criterion 1.6 Didactic and Teaching Methodology

However, in order to further strengthen the international and research-oriented profile of the programmes, the experts recommend further supporting students' technical and discipline-specific English-language skills.

Comment

We consider that improving students' English proficiency must begin with strengthening the language competencies of the teaching staff. Therefore, one of the university's priority measures is to motivate teaching staff to boost their English proficiency through the implementation KPI system. Teaches are encouraged to complete language training which is free of charge within the university and obtain international recognized English language certifications, such as IELTS and TOEFL.

Furthermore, the university offers professional development courses for teaching staff for English-Medium Instruction methodology. These courses are designed to develop staff competencies in delivering specialized content in English and integrating English-language teaching materials into the academic process.

We expect that these measures will create a developed English-learning environment. This, in turn, will enhance students' ability to engage with international scientific literature, participate in academic mobility programmes, communicate research results and more actively engage with international academic community.

Criterion 2 Exams: System, Concept and Organisation

While the formal module descriptions must more clearly specify assessment components, their weighting, and the requirements for "differentiated credit", this issue is further addressed under Criterion 4.1.

Comment

This issue has been fully addressed. A detailed response is provided in the comments to Criterion 4.1.

As evidence of the improvements implemented, the revised module handbooks attached to this report contain comprehensive information on the assessment components, their weighting, in final grade, calculation of final grade and assessment requirements for modules assessed using differentiated credit.

Criterion 3.1 Staff and Development

However, in order to support the university's internationalisation goals and the further development of English-medium and internationally oriented teaching, the experts strongly recommend expanding staff development opportunities, particularly in the areas of English-medium teaching and internationalization.

Comment

We agree with recommendation that boosting staff development in English medium teaching and internationalization is essential to support the university's strategy and to further enhance the quality of English-medium education. In response to this recommendation, the university initiated a number of measures focusing on strengthening teaching staff competencies in these areas. The undertaken and planned actions are presented in the comments to the **Criterion 1.6 Didactic and Teaching Methodology.**

Criterion 3.3 Funds and equipment

To further support the university's research profile and the research-oriented character of the programmes, the experts recommend strengthening the research environment, particularly through increased third-party funding and improved opportunities for international publication.

Comment

The university understands that a strong research environment is essential to maintaining the research-oriented nature of master's programmes, therefore a number of mechanisms to support research activities, competitive funding and international publications have been created. The efficiency of these mechanisms largely depends on the research initiative and active participation of teaching staff members.

The university and the department provide researchers with opportunities to participate in national and international competitive research funding programs. Over the past five years, the department's researchers have successfully completed seven research projects funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan, one project funded through program-targeted funding, and one international project. Furthermore, over the past four years, ten doctoral graduates have won the "Zhas Galym" Republican competition and received postdoctoral research grants from the Ministry of Science and Higher Education of the Republic of Kazakhstan.

As a part of their research projects, scientists develop and publish research results in international peer-reviewed journals indexed in Scopus and Web of Science, participate in international conferences, and obtain patents for inventions.

Examples of such work include the following scientific papers in peer-reviewed journals indexed in the Science Citation Index Expanded Web of Science and/or having a CiteScore percentile in the Scopus database (see Table):

Full name of the scientist	**Topic of the scientific project**	**Scientific article output data**
Professor Syrmanova K.K.	Development of technology for the production of bitumen materials for the road industry with the utilization of polymer	1.Syrmanova K.K, Kaldybekova Zh.B, Agabekova A.A, Baizhanova Sh.B, Tuleuov R., Khaldun Al Azzam, El-Sayed Negim, and Bounoua N.Modification of Petroleum Bitumen with Secondary Polyethylene in the Presence of Vermiculite.Indones. J. Chem. 2024, 24 (2), P.530 – 542, DOI:10.22146/ijc.90881. Q 3, percentile – 40.
		2. Syrmanova K.K, KaldybekovaZh.B., Agabekova A.A, BaizhanovaSh.B. Influence of the Chemical Composition of Kulantau Vermiculite on the Structure of Modified Bitumen Compositions. Journal Composites Science. 2024, vol. 8, 118 p. https://doi.org/10.3390/jcs8040118 Q2, percentile - 74

	waste in the technological process.	3.Syrmanova K.K., Tuleuov R.M., Kaldybekova Zh.B., Baizhanova Sh.B., Kolesnikova O.G,, Zhumayev Zh.Zh., Nigmetov M.Zh.,Yesbolay G.I. «Development of a Modified Bitumen Emulsion to Enhance the Operational Properties of Asphalt Concrete» опубл. внаучном журнале «Construction Materials and Products» ISSN2618-7183 2025 г. 8 том, №3 (квартиль Q2, percentile - 60).
Professor Anarbayev A.A.	Development of technology for the production of highly efficient materials based on mineral raw materials and man-made waste	1. Abibulla Anarbayev, Balzhan Kabylbekova , Zhakhongir Khussanov, Bakyt Smailov, YevgeniyKulikov.Research of the Process of Obtaining Monocalcium Phosphate from Unconditional Phosphate Raw Materials, Chem Engineering, 2025, 9, p.2-15 (Scopus, Q2)
		2.Tleuova, S., Pazylova, D., Tileuberdi, A., Ulbekova, M. and Sagindikova, N. Kinetics and synthesis of formation of phosphate composites from low-grade phosphorites in the presence of phosphate–siliceous shales and oil sludge //Green Processing and Synthesis, vol. 14, no. 1, 2025, pp. 20250070. https://doi.org/10.1515/gps-2025-0070
		3.Tleuova, S., Turishbekov, Z.,Tileuberdi, A., Pazylova, D., Iristaev, I., Ulbekova, M., Sagindikova, N. Modeling of Hydrodynamics of Agglomeration of Low-Grade Phosphorites in the Presence of Phosphate-Siliceous Shales and Oil Sludge. //ChemEngineering 2025, 9, 125. https://doi.org/10.3390/chemengineering9060125
		4.Tleuova S., Pazylova D., Tileuberdi A., Pashikeev S., Ulbekova M., Sagindikova N. Modern Approaches to the Enrichment and Engineering Processing of Poor Phosphate Ores. //Open ChemEng J, 2025; 19: e18741231400241. http://dx.doi.org/10.2174/0118741231400241250702101849
		5.Anarbayev A.A., Kabylbekova B.N., *Smailov B.M., Ormanova G.M. Methods for purifying table salt from the Suzak deposit. Complex Use of Mineral Resources. 2026; 338(3):5-12 ISSN-L 2616-6445, ISSN 2224-5243. http://doi:10.31643/2026/6445.23 Scopus Q3

Young scientist Raimbekov Ye.	A comprehensive study of the selective leaching process of low-grade phosphates using organic acids	1. Raiymbekov Y., Abdurazova P., Nazarbek U. Dissolution kinetics of carbonates of low-grade microgranular phosphate ore using organic acids as leaching agent // Mining. – 2024. – Vol. 4(4). – P.766-776. https://doi.org/10.3390/mining4040043
		2. Raiymbekov Y., Abdurazova P., Nazarbek U. Enrichment of low-grade phosphorites by the selective leaching method // Green Processing and Synthesis. – 2023. – Vol. 12. – P. 20228150. https://doi.org/10.1515/gps-2022-8150
		3. Raiymbekov Y. Enrichment of Low-Grade Phosphorites with Organic Acids. - Springer Nature, 2025. - 156 p. https://doi.org/10.1007/978-3-032-02910-2
Young scientist Asylkhankyzy A.	Research into methods for processing potash ores from the Zhilyanskoye and Chelkarskoye deposits into potassium-magnesium fertilizers	1. Assylkhankyzy A, Seitmagzimova G. Advanced Technologies of Potash Fertiliser Production from Promising Raw Materials // Open Chem Eng J. – 2024. – Vol. 18. http://dx.doi.org/10.2174/0118741231330310240906080722 (Scopus, Q2, percentile 65).
		2. AigerimAssylkhankyzy, Galina Seitmagzimova. An Innovative Environmentally Friendly Processing Method of Promising Carnallite Ores Engineering, Technology & Applied Science Research Vol. 15, No. 4, 2025, 24321-24327 - https://doi.org/10.48084/etasr.11159 **(**Scopus, Q2, Процентиль61**)**.
Young scientist Artykova Zh.	Development of technology for obtaining thermosalt-resistant composite	1.Artykova, Zhadyra, Beisenbayev, Oral, Issa, Aziza and Kydyraliyeva, Aigul. "Modification of polymers to synthesize thermo-salt-resistant stabilizers of drilling fluids" Open Engineering, vol. 15, no. 1, 2025, 20240097. https://doi.org/10.1515/eng-2024-0097Процентиль 54
		2. Artykova Zh.K., Beisenbayev O.K., Issa A.K., Kydyraliyeva A.Sh., Yegemberdieva S. The effect of polymer properties

	polymer stabilizers of drilling fluids for drilling deep wells	on the rheological behavior of Darbaza clay-Based Suspensions. A comparative experimental study on molecular weight, composition, and concentration effects. Engineering, Technology & Applied Science Research. Vol. 15, No. 6, 2025, 29641-29646. https://doi.org/10.48084/etasr.13643 Процентиль 56

To encourage the development of young researchers, the university annually organizes the internal grant competition for young scientists, which provides funding of up 3 million KZT for 12-month research projects in priority research areas, including environmental protection, sustainable use of natural resources, energy and advanced materials, advanced manufacturing and digital technologies, life sciences and sustainable agricultural development. This program serves as an important mechanism for developing research potential and preparing researchers for participation in larger national and international funding competitions.

The Center for Scientific and Analytical Information regularly conducts seminars and training workshops for reaching staff and students on selecting appropriate journals, preparing manuscripts in accordance with international publishing standards, and effectively using international scientific database. These activities support researchers in publishing the results of their studies in internationally recognized peer-reviewed journals indexed in Scopus and Web of Science.

Thus, the institutional structure and funding opportunities necessary to strengthen the research environment are already in place. The university will continue to expand these support mechanisms and encourage teaching staff to actively participate in competitive research funding, international scientific collaborations and publications in highly ranked international journals, thereby further enhancing the research profile of its programmes.

Criterion 4.1 Module Descriptions

However, they must be supplemented with transparent information on the calculation of final grades, assessment components, weighting, and the requirements for differentiated credit. In addition, the experts recommend broadening and internationalising the reading lists.

Comment

Prior to the external evaluation, detailed information on assessment methods, grading criteria and final grade calculation was already provided to students in the syllabi, which are

accessible through the university's learning management system at the beginning of each course.

In response to experts' recommendation, all module descriptions have been comprehensively revised to ensure the same level of transparency in module handbooks which serve as the official programme documentation. The revised module descriptions now consistently provide information about the assessment components, their weight in the final grade, and the method for calculation the final grade for each course.

For modules assessed using the differentiated credit system, the module descriptions have been supplemented with detailed information on assessment requirements, including the form of assessment (e.g., repot, oral defence), assessment criteria for each component, and the contribution of each component to the final grade. These changes ensure that students, teaching staff, external reviewers and other stakeholders can clearly understand the requirements for successful completion of each module.

Furthermore, the recommended reading lists have been reviewed and updated. Along with publication written by the university staff, the reading lists have been expanded to include international recognized sources relevant to learning outcomes of each module.

In addition, in line with expert recommendations, the revised module handbooks have been updated to reflect recent curriculum enhancements. Specially, they now include newly introduced topics related to economic considerations of chemical technology, renewable and future-oriented energy technologies, sustainability, hydrogen technologies and industrial software, providing a comprehensive and up-to-date description of the educational content.

To further enhance transparency and ensure access to information about programmes for all stakeholders, the revised module handbooks published on the university's site.

Criterion 4.2 Diploma and Diploma Supplement

In summary, the experts confirm that Auezov University has prepared diploma supplement-related documentation, but the submitted versions are not yet sufficiently clear and consistent. Therefore, the experts consider it necessary that a uniform diploma supplement is issued for all graduates.

Comment

We appreciate the observation of experts and would like to clarify the purpose and status of the two kind of documents submitted with SAR.

The documents 06/DS-01 and 06/DS-02 are **Diploma Supplements** (European format) issued by the University in English. They are intended to facilitate international recognition of qualifications by providing comprehensive information on the qualification awarded, the programme completed, the learning outcomes, the level of qualification and the national higher education system. The Diploma Supplement (European format) is officially issued by Kazakhstan higher educational institutions in accordance with State Mandatory Standard for Higher and Postgraduate Education (see app. 24-02, paragraph 62).

The documents submitted as app.21-03 and 21-04 are official **supplement to diploma (transcripts)** issued in accordance with the national legislation of the Republic of Kazakhstan in three languages (Kazakh, English and Russian). These transcripts contain information on the courses completed, credits earned, grades obtained and the overall academic performance of student, as required by national regulatory framework. The standardized trilingual transcript form is established by Order No. 47 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated 10 February 2023 (Appendix 10).

Also, app.21-03 and 21-04 contain copies of diploma certificates issued to graduates together with transcripts.

All graduates receive both:

- The Diploma Supplement (European format) in English,
- The official diploma certificate and supplement to diploma (transcripts) in three languages.

We submitted both sets of documents in accordance with *Checklist of Required Evidences* specified for Criteria 1.2 and 4.2 in the document "**Template and Guidelines for Preparing a Self-Assessment for an International ASIIN Program Accreditation**"."

F Summary: Expert recommendations (10.08.2026)

Taking into account the additional information and the comments given by the university the experts summarize their analysis and **final assessment** for the award of the seal as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ma Chemical Technology or Inorganic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032
Ma Chemical Technology or Organic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Make the learning outcomes available to all stakeholders.
A 2. (ASIIN 4.1) Make the module descriptions available to all stakeholders.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3, 1.6) It is recommended to further support the development of students' English language skills, especially technical/discipline-specific English.
E 2. (ASIIN 3.1) It is recommended to expand staff development opportunities, particularly in the areas of English-medium teaching and internationalisation.

G Comment of the Technical Committees 01 and 09

Technical Committee 01 – Mechanical Engineering/Process Engineering (11.09.2026)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the assessment of the experts without any changes.

Assessment and analysis for the award of the Euromaster®Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the fields of knowledge set by ECTNA.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ma Chemical Technology or Inorganic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032
Ma Chemical Technology or Organic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Make the learning outcomes available to all stakeholders.
A 2. (ASIIN 4.1) Make the module descriptions available to all stakeholders.

Recommendations

For all degree programmes

E 1.(ASIIN 1.3, 1.6) It is recommended to further support the development of students' English language skills, especially technical/discipline-specific English.

E 2.(ASIIN 3.1) It is recommended to expand staff development opportunities, particularly in the areas of English-medium teaching and internationalisation.

Technical Committee 09 – Chemistry, Pharmacy (08.09.2026)

Assessment and analysis for the award of the ASIIN seal:

This marks the second reaccreditation of the two degree programs. The expert panel proposes only two formal requirements regarding the publication of learning objectives and module descriptions. In addition, two recommendations are to be made regarding students' English proficiency and continuing education opportunities for faculty. After a brief discussion, the academic committee approves the review panel's proposals.

Assessment and analysis for the award of the Euromaster®Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the fields of knowledge set by ECTNA.

The Technical Committee 09 – Chemistry, Pharmacy recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ma Chemical Technology or Inorganic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032
Ma Chemical Technology or Organic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Make the learning outcomes available to all stakeholders.
A 2. (ASIIN 4.1) Make the module descriptions available to all stakeholders.

Recommendations

For all degree programmes

E 1.(ASIIN 1.3, 1.6) It is recommended to further support the development of students' English language skills, especially technical/discipline-specific English.

E 2.(ASIIN 3.1) It is recommended to expand staff development opportunities, particularly in the areas of English-medium teaching and internationalisation.

H Decision of the Accreditation Commission (25.09.2026)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discussed the procedure and follows the experts' and Technical Committees' assessment while changing the requirements' wording to its standard wording to ensure uniformity.

Assessment and analysis for the award of the Euromaster®Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the fields of knowledge set by ECTNA.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ma Chemical Technology or Inorganic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032
Ma Chemical Technology or Organic Substances	With requirements for one year	30.09.2032	Euromaster®	30.09.2032

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Ensure that the intended learning outcomes are transparently anchored and published, making them accessible to all relevant stakeholders.

A 2. (ASIIN 4.1) Ensure that all module descriptions are publicly available and accessible to all stakeholders in a consistent and transparent manner.

Recommendations

For all degree programmes

E 1.(ASIIN 1.3, 1.6) It is recommended to further support the development of students' English language skills, especially technical/discipline-specific English.

E 2.(ASIIN 3.1) It is recommended to expand staff development opportunities, particularly in the areas of English-medium teaching and internationalisation.

Appendix: Programme Learning Outcomes and Curricula

According to the submitted learning outcomes (app. 05-01 and 05-02) which are also pasted in the diploma supplements, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Master's degree programmes:

Master's programme Chemical Technology of Inorganic Substances

Programme Goal: Training of highly demanded research and teaching personnel in the field of Chemical Engineering for the higher education system and the scientific sector.

Learning Outcomes of the Master's Degree Programme:

- LO1Critically analyze scientific and technical information in the field of chemical engineering, applying knowledge of a foreign language and information resources, summarizing research results in scientific articles, reports and dissertation taking into account principles of scientific ethics.
- LO2 Analyze ideological and methodological problems, including of interdisciplinary nature based on provisions of the philosophy of science and research methodology.
- LO3 Apply scientific organization of pedagogical activity in higher education demonstrating possession of socio-psychological technologies for managing mass behavior, effective teaching methods in the field of chemical engineering.
- LO4 Effectively coordinate a work of enterprise departments, showing leadership qualities and critical thinking when making operational management decisions in non-standard situations.
- LO5 Organize operational dispatch control of the production process for obtaining inorganic compounds, applying knowledge and skills to analyze problems in interdisciplinary related fields of knowledge.
- LO6 Suggest ways to modernize the technological scheme of production, new methods of recycling industrial waste from production of inorganic substances and compounds based on analysis of modern achievements in science and technology.
- LO7 Independently plan and carry out scientific research, substantiating and proving research results when discussing with specialists and a wider audience in domestic and international scientific community.

- LO8 Analyze the experimental results and results of mass and heat calculations of studied chemical-technological processes using mathematical modeling programs and artificial intelligence to justify the optimal production mode.
- LO9 Develop acquired knowledge and skills to a level that allows to study in a doctoral program, to improve qualification lifelong.

Master's programme Chemical Technology of Organic Substances

Programme Goal: Training of highly qualified specialists who master modern approaches to production organization and enterprise management, as well as technological design, and who are capable of carrying out scientific and pedagogical activities.

Learning Outcomes of the Master's Degree Programme:

- LO1Analyzes and summarizes scientific and technical information with the involvement of information resources, using knowledge of a foreign language; summarizes the results of research work in the form of a scientific article, report.
- LO2 To design and conduct comprehensive and interdisciplinary research based on a holistic systematic scientific worldview using knowledge in the field of history and philosophy of science.
- LO3 Performs scientific and pedagogical activities using the scientific and pedagogical activities using the scientific organization of pedagogical activities in higher education, innovative and digital learning technologies, effective teaching methods in the field of chemical technology of organic substances.
- LO4 They lead a team of specialists using the principles and methods of management psychology, showing creativity and logical thinking in non-standard production situations.
- LO5 Coordinates technological processes of processing of hydrocarbon raw materials, production of organic substances, assess the economic efficiency of technological processes and their environmental safety in order to comply with the safety of life and environmental cleanliness.
- LO6 Develops a proposal for the modernization and reconstruction of existing installations that ensure the production of products that meet environmental quality standards.
- LO7 Implements independent scientific developments into production; conducts marketing of high-tech technologies.

- LO8 Designs new technological equipment and its elements for deep processing of hydrocarbon raw materials, synthetic fibers, production of sulfur from natural gas using application software packages.
- LO9 Using neural networks, the skills of using special products, additives, selecting and regulating the properties of technical liquids, and preparing recipes for polymer compositions are mastered.
- L10 Solves problems in interdisciplinary related fields of knowledge, having skills in learning; skills in making informed decisions and a responsible attitude to issues of environmental protection, ensuring economic viability and a fair foundation for the existence of society in the interests of present and future generations.

For the Master's programme Chemical Technology of Inorganic Substances, the following **curriculum** is presented:

Table 3. Curriculum of the Master's program 7M07162 Chemical technology of inorganic substances

1st semester	2nd semester	3rd semester	4th semester
M1. History and Philosophy of Science 2 lec 1pr **4 ECTS** exam	M9Teaching Practice **4 ECTS** Differentiated credit	M15 Research Internship **6 ECTS** Differentiated credit	M22 Research work of a master's student 4 **17 ECTS** Differentiated credit
M2. Foreign language (professional) 3 pr **4 ECTS** Differentiated credit	M10.1 Study of thermodynamics and kinetics of technological processes M10.2 Fertilizer application technologies 2 lec 2 pr **5 ECTS** exam	M16.1 Adsorption processes in inorganic technology M16.2 Inorganic Pplymer Technology 2 lec, 2 lab **5 ECTS** exam	M23 Preparation and defense of a master's thesis **8 ECTS**
M3. Pedagogy and Psychology of Higher Education 2 lec 2 pr **5 ECTS** exam	M11.1 Modern structural materials in chemical engineering M11.2 Physical chemistry of surfaces 2 lec, 2 labs, 1 pr **6 ECTS** exam	M17.1 Innovative technologies of feed salts M17.2 Mathematical planning and processing of experimental results 2 lec 2 pr **5 ECTS** exam	
M4. Management Psychology 1 lec 1pr **3 ECTS** exam	M12.1 Energy-efficient technologies of mineral acids M12.2 Advanced Soda Ash Technologies 2 lec, 2 labs, 1 pr	M18.1 Resource-saving technologies for processing man-made waste M18.2 Environmental Risk Management 2 lec, 2 lab	

	6 ECTS exam	**5ECTS** exam	
M5.1 Design of chemical plants M5.2 Statistical methods for processing scientific data 1 lec, 2 pr **4 ECTS** exam	M13.1 Innovative technologies of digestible phosphates and nitrates M13.2 Chemical technology of reactive acids and salts 2 lec, 2 labs, 1 pr **6 ECTS**	M19.1 Prospects for the Development of Complex Mineral Fertilizer Production M19.2 Modern technologies for processing mineral raw materials 2 lec, 2 lab **5ECTS** exam	
M6.1 Methods of studying inorganic compounds M6.2 Physicochemical analysis of inorganic substances 1 lec 2 lab **4 ECTS** exam	M14 Research work of a master's student 2 **3 ECTS** Differentiated credit	M20.1 Current Issues in Electrochemical Technology M20.2 Functional electroplating 2 lec, 2 labs, 1 pr **6 ECTS** exam	
M7.1 Graphical analysis of processes in multicomponent systems M7.2 Advanced study of phase equilibria in multicomponent systems 2 lec, 2 pr **5 ECTS** exam		M21 Research work of a master's student 3 **3 ECTS** Differentiated credit	
M8 Research work of a master's student 1 **1 ECTS** Differentiated credit			
Σ9lek+11pr+2lab=22h/week	Σ8 lek + 5 pr + 6 lab = 19 h/week	Σ10lek+3pr+8lab=21h/week	
30 ECTS	**30 ECTS**	**35 ECTS**	**25 credits**
Total			**120 ECTS**
7 exams, 2 differentiated credits	4 exams, 2 differentiated tests	5 exams,2 differentiated credits	1 differentiated credit + defense
Elective modules 13ECTS (43.33%)	Elective modules 23 ECTS (76.66%)	Elective modules 26 ECTS (74.29%)	

* lec – lecture hours, pr – practice hours. Lab – laboratory hours per week

For the Master's programme Chemical Technology of Organic Substances, the following **curriculum** is presented:

Table 4. Curriculum of the Master's program 7M07170 Chemical technology of organic substances

1st semester	2nd semester	3rd semester	4th semester
M1 History and philosophy of science 2 lec 1 pr **4ECTS** exam	M8 Teaching practice **4 ECTS** Differentiated credit	M14 Research practice **6 ECTS** Differentiated credit	M21 Research work of a master's student 4 **17 ECTS** Differentiated credit
M2 Foreign language (professional) 3pr **4 ECTS** **Differentiated credit**	M9.1 Modern technologies of petrochemical synthesis M9.2 Innovative technologies in oil refining and petrochemistry 2 lec, 1 pr **4ECTS** exam	M15.1 Chemistry and technology of biologically active additives M15.2 Promising processes for obtaining sulfur from hydrocarbon gases 2 lec, 2 labs, 1 pr **6ECTS** exam	M22 Preparation and Defense of a Master's Thesis **8 ECTS**
M3 Psychology of Management 1 lec 1pr **3ECTS** exam	M10.1 Featured Petrochemical Leaders M10.2 Chemical reactor design 2 lec, 2 lab, 2 pr **7ECTS** exam	M16.1 General chemical technology of synthetic fibers M16.2 Rational methods for processing heavy oils and oil residues 2 lec, 2 lab **5ECTS** exam	
M4 Pedagogy and Psychology of Higher Education 2 lec 2 pr **5ECTS** exam	M11.1 Scientific basis for the creation of polymer composite materials M11.2 Modern tire production processes 2 lec, 2 lab, 2 pr **7ECTS** exam	M17.1 Development and application of additives for modifying the properties of fuels and oils M17.2 Scientific principles of formulation of elastomer compounds 2 lec, 2 lab **5ECTS**	

		exam	
M5.1 Resource-saving technologies M5.2 Prospects for the development of motor fuel production from hydrocarbon raw materials 2lec 2lab1pr **6ECTS** exam	M12.1 Organic gas chemistry M12.2 Production of soot from gas feedstock 2 lec, 1 lab, 2 pr **6ECTS** exam	M18.1 Specialty petroleum refining and petrochemical products M18.2 Industrial ecology of hydrocarbon systems 2 lec, 2 lab **5ECTS** exam	
M6.1 Nanostructured polymeric materials M6.2 Ways to intensify the production and processing of elastomers 2lec 2lab1pr **6ECTS** exam	M13 Research work of a master's student 2 3ECTS Differentiated credit	M19.1 Modeling of chemical-engineering processes of oil refining in MatLab and ChemCad M19.2 Biodispersions 2 lec, 2 pr **5ECTS** exam	
M7 Research work of a master's student 1 1ECTS Differentiated credit		M20 Research work of a master's student 3 3ECTS Differentiated credit	
Σ9lek+4lab+9pr=22h/week	Σ8lek+5lab +7pr=20h/week	Σ10lek+8lab+3pr = 21 hours/week	Σ6lek+5pr+ 2lab=13/week
29 ECTS	**31 ECTS**	**35 ECTS**	**25 ECTS**
Total			**120 ECTS**
5 exams,***2 differentiated credits***	4 exams,***2 differentiated credits***	5 exams,***2 differentiated credits***	***1 differentiated credit + defense***
Elective modules 12 ECTS (41%)	Elective modules 24 ECTS (77%)	Elective modules 26 ECTS (74%)	

lec – lecture hours, pr – practice hours. Lab – laboratory hours per week