ASIIN Seal & EUR-ACE® Label

Accreditation Report

Bachelor's and Master's Degree Programmes
Geology and exploration of mineral deposits
Mining Engineering
Oil and Gas Engineering

Provided by
Satpayev Kazakh National Research Technical University

Version: 01.07.2016

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	**(Official) English translation of the name**	**Labels applied for** [1]	**Previous accreditation (issuing agency, validity)**	**Involved Technical Committees (TC)**[2]
Геология и разведка месторождений полезных ископаемых	Geology and Exploration of Mineral Deposits B.Sc.	ASIIN, EUR-ACE® Label	2010-2015, ASIIN	TC 11
Геология и разведка месторождений полезных ископаемых	Geology and Exploration of Mineral Deposits M.Sc.	ASIIN, EUR-ACE® Label	--	TC 11
Горное дело	Mining Engineering B.Sc.	ASIIN, EUR-ACE® Label	2010-2015, ASIIN	TC 11
Горное дело	Mining Engineering M.Sc.	ASIIN, EUR-ACE® Label	--	TC 11
	Oil and gas Engineering	ASIIN, EUR-ACE® Label	2010-2015, ASIIN	TC 11
	Oil and gas Engineering	ASIIN, EUR-ACE® Label	--	TC 11
Date of the contract: xx.xx.20xx **Submission of the final version of the self-assessment report:** xx.xx.20xx **Date of the onsite visit:** 01.03.2016				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

[2] TC: Technical Committee for the following subject areas: TC 01 – Mechanical Engineering/Process Engineering; TC 02 – Electrical Engineering/Information Technology); TC 03 – Civil Engineering, Surveying and Architecture; TC 04 – Informatics/Computer Science); TC 05 – Physical Technologies, Materials and Processes); TC 06 – Industrial Engineering; TC 07 – Business Informatics/Information Systems; TC 08 – Agronomy, Nutritional Sciences and Landscape Architecture; TC 09 – Chemistry; TC 10 – Life Sciences; TC 11 – Geosciences; TC 12 – Mathematics; TC 13 – Physics.

at: Almaty	
Peer panel: Prof. Dr. Andreas Hoppe, Technical University of Darmstadt; Prof. Dr. Bernd Lehmann, Technical University of Clausthal; Prof. Dr. Norbert Meyer; Technical University of Clausthal; Olga Ageyeva (Student), East Kazak State Technical University; Dipl. Geol. Stephan Peters, DMT GmbH & Co. KG.	
Representative of the ASIIN headquarter: Dr. Michael Meyer	
Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2014 Subject-Specific Criteria of Technical Committee 11 – Geosciences as of 09.12.2011	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Geology and Exploration of Mineral Deposits	Бакалавр/ Bachelor of Science		Level 6	Day time	--	8 Semesters	129 KZ credit	WS 01/02, Fall Semester
Geology and Exploration of Mineral Deposits	Магистр Master of Science		Level 7	Day time	--	4 Semesters	59 KZ credit	WS 01/02, Fall Semester
Oil and gas Engineering	Бакалавр/ Bachelor of Engineering	1. Reservoir Engineering 2. Production Engineering 3. Oil and gas well drilling 4. Design, Construction and exploration of oil and gas pipelines and storages	Level 6	Day time	--	8 semesters	129 KZ credit	WS 01/02, Fall Semester

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

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Oil and gas Engineering	Магистр Master of Engineering	1. Reservoir Engineering 2. Production Engineering 3. Oil and gas well drilling 4. Design, Construction and exploration of oil and gas pipelines and storages	Level 7	Day time	--	4 semesters	59 KZ credit	WS 01/02, Fall Semester
Mining	Бакалавр/ Bachelor of Science	Rock Failure and Shaft Construction; Open development of mineral resources; Mine Survey; Underground development of mineral deposits	Level 6	Full time	--	8 Semesters	160 KZ Credits-	WS 01/02, Fall Semester
Mining	Магистр/ Master of Science		Level 7	Full time	--	4 semesters	59 KZ credit	WS 01/02, Fall Semester

For all Bachelor's degree programmes the institution has presented the following general profile in the self-assessment report: The main objective of studying is to train specialists capable of setting self-sustained theoretical and practical objective in their study area and resolve the set problems at the professional level. According to the academic curriculum, to meet the set objectives bachelor students are being taught three main discipline types: General Education (GE), Fundamental Educational (FE) and Applied Education (AE). By studying General Education, the students are obligated to know the following: history of RoK, philosophy, ecology and social and humanitarian educational disciplines; know Kazakh, Russian and foreign languages; PC usability as a management tool and use other general duty software; use information from web.

For the Bachelor's degree programme Geology and Exploration of Mineral Deposits the institution has presented the following profile in the self-assessment report:

Students are obligated to know essentials of mathematics, physics, chemistry, descriptive geometry and computer graphics. Additionally they will obtain professional knowledge and skills essential for all types of works in Geology and Exploration of Mineral Deposits and Geological Service of mineral resources sector.

The students will obtain professional knowledge and skills essential for all types of works in Geology and Exploration of Mineral Deposits and Geological Service of mineral resources sector especially in the areas of research and subsurface use, production and exploration fields, science and education orientated organizations. In these working areas they should be able to handle with earth crust, structural regions, oil and gas basins, ore deposit allotments, hydrocarbon fields, geological mapping, exploration and appraisal of all types of resources, application of modern geophysical, hydrogeological and geological drilling methods and aerial imagery.

The formation and development objectives of education were set with an aid of representatives from "Uzhkaznedra" Trans-Regional National Institution and Satpayev Institute of Geological Science.

For the Master's degree programme Geology and Exploration of Mineral Deposits the institution has presented the following profile in the self-assessment report:

The main objective is to provide full and qualified professional education in Geology justified by graduate level of knowledge and skills and competences concerning to National Obligatory Standards criteria.

Therefore the institution will educate specialists and managers for different organizations orientated towards sub-surface geological research (regardless of the stage of exploration and production). The students should be prepared as well to work on research activities in geology and exploration of any type of resources at all kind of higher education institutions

For the Bachelor's degree programme Mining the institution has presented the following profile in the self-assessment report:

The objectives of the programme are the training for enterprises of the mining complex of professionally educated and competent professionals capable of working in the primary engineering and technical positions, and effectively conduct the extraction of natural resources in a variety of geological and mining conditions on the basis of high technology and modern mining equipment.

Students should be trained

- in the development of mineral deposits, confirmed the level of knowledge and skills, skills and competences on the basis of criteria established by the state educational standard of their evaluation, both in content and volume
- for the mining industry, who know the technology, comprehensive mechanization, organization and economy of mining production, methods and principles of its improvement and design.
- in the development of mineral deposits and the creation of new technologies of mining and production management;
- in the use of methods of analysis and evaluation of experiments;

They should be able to apply knowledge of mathematics, basic sciences and engineering;

They should have knowledge of contemporary issues of mining production to promote the acquisition of skills for the development of mineral resources, the mathematical treatment of the results of research, technological preparation of passports of technological processes using modern information technologies.

They should be able

- to use the techniques, skills and modern engineering tools necessary in engineering practice;
- to find and work with the necessary literature, computer information, databases, and other sources of information for the task.

Students should train their skills in teamwork, ethical responsibility, the ability to understand problems and their cooperation with various specialists to find solutions.

The objects of professional activity of the students are the mining enterprises of ferrous and non-ferrous metallurgy, fuel and energy complex, the production of non-metallic mining of raw materials, industry research and design institutes, laboratories, universities and college, elementary professional education.

The subject of professional activity of students on a specialty "Mining" is the improvement of mining technology, development and creation of new technology and production technology to meet the needs of the mining industry of the Republic of Kazakhstan.

The functions of professional activity are monitoring of the implementation processes of mining operations, Quality control of mineral resources, analysis of the environmental and economic performance of the mining industry, improvement of technological processes ore mining, organization and management of production, techno-economic analysis of the technological processes and production activities.

For the Master's degree programme Mining the institution has presented the following profile in the self-assessment report:

The main objective is to provide the conditions for getting a vocational education in professional competences, which allow graduates to carry out the teaching and research work.

For the Bachelor's degree programme Oil and Gas Engineering the institution has presented the following profile in the self-assessment report:

1. Implementation of training program of specialists of oil industry workers who are knowing technologies of drilling of oil and gas wells, processes of development and operation of oil and gas fields, design and operation of gas and oil pipelines and gas and oil storages onshore and offshore and having fundamental preparation on the general, basic and profile disciplines presenting to the trainee opportunity for further independent increase of level of preparation.

2. Providing the trainee with knowledge, abilities, skills and competences allowing to see, analyze and find solutions of engineering problems in the field of professional activity with use of modern computer technologies and results of experimental and research works.

3. Providing social and humanitarian education on the basis of laws of social and economic development of society, history, state language, Russian and other foreign languages,

supporting ideals of ethical behavior, professionalism and ecologically responsible use of natural resources.

The goals of the programme based on development of multilevel system of training, fundamental nature and quality of training, unity of training, education, research and innovative activity for satisfaction inquiries of consumers has to provide:

- receiving full and quality professional education in the field of the oil and gas engineering confirmed with the level of knowledge and ability, skills and competences on the basis of the State general education standard;
- ensuring of training bachelor for various branches of oil and gas engineering , knowing methods and the principles of research, design of development and operation of oil and gas fields;
- training professional and competitive experts in the field of oil and gas engineering and creation new technologies and production management;
- ability to apply knowledge of mathematics, fundamental and technical science;
- using methods of carrying out, analysis and assessment results of experiments;
- knowledge of modern problems of production;
- formulation of the main technical and economic requirements to the equipment, ways of operation of wells, collecting and preparation borehole production;
- acquisition of practical skills on mathematical processing of results of scientific research, drawing up route maps of technological processes with application of modern information technologies;
- ability to use methods of carrying out, analysis and assessment of results of experiments;
- ability to use the methods, skills and modern technical means necessary in engineering practical activities;
- ability to find and work with necessary literature, computer information, databases and other sources of information for the solution of objectives;
- formation the skills of work in team, production and ethical responsibility, need to improve their knowledge and skills, ability to understand a problem and find with various experts versions of decisions, need for improvement of the knowledge and skill, and solve problems on their own, if necessary;

- ability to position itself at the decision and the formulation of technical tasks in a common information space of the extracting system;
- ability effectively interact and work in team;
- ability to work in team on interdisciplinary subject, show identity, and if it necessary to solve problems independently;
- readiness of students for professional activity by means of the disciplines providing fundamental knowledge, work skills in oil and gas branch, the state organizations and educational institutions;
- ability to apply knowledge of mathematics, fundamental and technical science;
- ability to position itself at the decision and the formulation of technical tasks in a common information space of the extracting system;
- ability to use the methods, skills and modern technical means necessary in engineering practical activities;
- to know modern public and political problems to know state and foreign languages, tools of market economy, safety issues and environmental protections.

Subjects of professional activity of the graduates are oil and gas layers, oil and gas wells, underground and land equipment, drilling rigs and units, field and main pipelines, installations of field preparation of oil and gas, pump and compressor stations, tanks for storage of hydrocarbons; equipment for research of wells, layers, fluids.

Functions of professional activity:

- drilling of wells, fastening and cementation of well bores;
- development of wells;
- operation of a drilling equipment;
- operation of the equipment for oil and gas production;
- research of wells and layers;
- operation of the equipment of trade preparation, transport and storage of oil and gas.

For the Master's degree programme Oil and Gas Engineering the institution has presented the following profile in the self-assessment report:

1. The research activity.

- Carries out literary and patent search, makes reports, information reviews, the conclusions, etc.
- Carries out planning of pilot studies, chooses methods of researches.
- Develops the scheme and a design of experimental installation, carries out installation and debugging.
- Conducts pilot studies of processes, units and production;
- Processes data with application of techniques of planning, the regression and correlation analysis.
- Develops and investigates mathematical models of oil and gas extraction processes.
- Carries out the analysis and generalization of results of research, publishes results, makes out patents.

2. The design activity.

- Makes the hardware and technological scheme
- Carries out technological, heat technical and power calculations
- Counts the aero - and to hydrodynamics engineer according to the scheme of a chain of devices.
- Counts the basic and chooses the service equipment.
- Develops or chooses drawings of the equipment, production, wells and tanks.
- Develops imitating models of oil and gas extraction processes.

3. The design and technological activity.

- Develops technological processes of extraction, collecting and preparation of oil and gas;
- Develops the scheme of oil and gas extraction processes, proves regime parameters and indicators
- Makes the engineering plan of the technological project
- Develops the power - and resource-saving technologies in the field of oil and gas production and their preparation;
- Develops actions for environment protection for oil and gas extraction production.

4. The organizational and administrative activity.

- Carries out information support of production, work and management;
- Carries out actions for the organization of production according to normative documents;
- Develops and makes necessary documentation;
- Will organize activity of collective, makes plans of works and sets tasks.
- Resolves issues of material support, control of execution of tasks.

C Peer Report for the ASIIN Seal[4]

1. The degree programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Learning objectives on the websites (available in Russian and Kazakh)
- Diploma Supplement for each of the degree programmes
- Learning objectives according to the Self Assessment Report

Preliminary assessment and analysis of the peers:
The university defined objectives and learning outcomes for all of the programmes. The peers could identify programme specific information on the webpage of the university where the aims of the programmes are available in Russian and Kazakh.

The peers examined the objectives and the learning outcomes of all four degree programmes in the light of the Subject-Specific Criteria (SSC) of the Technical Committee for Geosciences of ASIIN to assess if they reflect the level of academic qualification aimed at and are equivalent to the learning outcome examples described in the respective ASIIN Subject-Specific Criteria as far as it is reasonable for the specified programmes. The peers came to the following assessment:

The peers asserted that all Bachelor's degree programmes aim that students should get basic knowledge and understanding of the natural sciences (Physics, Chemistry, Mathematics), of the essential features, processes, materials, history and the development of the Earth and life and of the key aspects and concepts of geology, including some at the forefront of that discipline as well as knowledge of the common terminology and nomenclature and the use of bibliography in Geosciences. Additionally the students should have the awareness of the wider spectrum of geological disciplines, of the temporal and spatial dimensions in Earth processes, of the applications and responsibilities of Geosciences and

[4] 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.

its role in society including its environmental aspects and of major geological paradigms, the extent of geological time and plate tectonics.

Regarding analysis, design and implementation the peers saw that the students should get an understanding of the complexity of field specific problems. They should get basic ability in the formalisation and specification of problems and the description of solutions. The students should be able to integrate field and laboratory evidence and to appreciate issues concerning sample selection, accuracy, precision and uncertainty during collection. They should get adequate technological, methodological and transferable skills and additional professional skills to be aware of economic, ecologic, social and legal aspects expected in professional practice.

For the master programmes the peers realized that the students should get advanced knowledge and understanding of the general principles of geosciences and deeper knowledge of their specialisation. They should be able to solve complex, incompletely defined and unfamiliar problems with innovative methods and to develop new methods. The students should be able to design appropriate experiments, to analyse and interpret data and draw conclusions integrating knowledge out of different disciplines. They should be able to create models of complex systems and should get advanced professional skills for independent work in their professional and scientific fields.

In general, type and level of objectives and learning outcomes of the degree programmes seem to reflect the level of European first and second cycle programmes. Overall, the audit team found that the learning outcomes have been described sufficiently and transparently, yielding a sound basis for the assessment of the students' and graduates' knowledge, skills and competences. According to the audit team, the learning outcomes reflect the level of the qualification sought and are achievable, valid, and reflect currently foreseeable developments in the subject area. The learning outcomes are adequate to the requirements described in the field specific criteria of the ASIIN Technical Committee of Geosciences.

The formulation of the learning outcomes were discussed with representatives of private companies and governmental institutions.

Criterion 1.2 Name of the degree programme

Evidence:

- Overview of Degree Programmes

Preliminary assessment and analysis of the peers:
The peers discussed the programme names and concluded that the titles of all programmes properly reflect the intended aims and learning outcomes.

Criterion 1.3 Curriculum

Evidence:

- Sequence of modules for each degree programme
- Self-assessment report
- Module descriptions provided by the university
- Interviews during the audit with programme coordinators, lecturers, industry representatives and students

Preliminary assessment and analysis of the peers:
The auditors assessed the curricula of the programmes under review against the programme objectives provided in the self-assessment report as well as against the stipulations of the Subject-Specific Criteria. The peers received an overview of the sequence of modules for the different degree programmes; the overall objectives and intended learning outcomes for the degree programme are systematically substantiated and updated in its individual modules.

The university has not provided the full set of module descriptions before the onsite visit so the peers got summaries of the syllables in English only after their return.

All curricula of the bachelor's degree programmes are structured in three main types. The general education modules contain history of Kazakh, philosophy, ecology and social and humanitarian educational contents as well as Kazakh, Russian and foreign languages and basics in computer sciences. In the so called fundamental education the basics of natural science are taught in the fields of mathematics, physics, chemistry and descriptive geometry and computer graphics. During the applied education students will obtain field specific knowledge and competences of the specific discipline. This general structure is defined by the government as well as the extent and the content of the general education part. While all modules are compulsory in the general education, in the fundamental and applied education most modules are electives.

The peers wondered how the study aims could be fully achieved regarding the large ratio of elective courses. On the first view it seemed to them that the elective courses apparently contain a lot of field specific basics which are core disciplines of the single programmes. But they learned that the advisors for selection of elective courses ensure that all basics modules are selected by the students.

The bachelor's degree programme Geology and Exploration of Mineral Deposits contains six weeks of practice including two weeks of field work and four weeks four internships in companies or governmental institutions. During the field work. which is done in two field camps of the department, students are trained in mapping and identifying rocks while they get mainly production experience during the internship at companies. From the view of the auditors it would be useful for the students to get more practical experience in field work, not only with regard to the duration but also as to knowledge of different types of mineral deposits within the diversified geology of Kazakhstan or abroad.

During the discussions the peers learned that a module of geological mapping has to be passed by all students. The module contains modern mapping technology from geoinformation systems and remote sensing techniques. The identification of minerals and rocks during the field work is accompanied by several special theoretical modules.

The master's degree programme Geology and Exploration of Mineral Deposits contains as well core modules out of the so called fundamental education. The field specific modules and applied modules are completely elective; so students have great opportunities to set their own individual specifications.

The bachelor's degree programme Oil and Gas contains four specifications in Reservoir Engineering, Production Engineering, Oil and Gas Well Drilling and Design, Construction and Exploration of Oil and Gas Pipelines and Storage. These specifications are defined by compulsory courses and some elective courses. With this structure the programme ensures from the view of the peers that students reach the aimed learning outcomes. The peers welcomed that some modules in the single specifications are hold in English language. The programme includes several internships in companies and two weeks of field work. For the study aims in this programme the duration of the field work seemed to be adequate for the peers.

The master's degree programme Oil and Gas continues the four specialisations of the bachelor programme in a convincing way, even it does not include any internship.

The curriculum of the bachelor's degree programme Mining was changed by the department since the last accreditation. Some compulsory and elective modules were exchanged and mathematical and physical aspects increased. Additionally, more production practice in companies was included into the curriculum. Last but not least four specialisations in Rock Failure and Shaft Construction, Open-pit Development of Mineral Resources, Mine Survey and Underground Development of Mineral Deposits were defined. The student becomes familiar with different types of mines during the internships; therefore it is not necessary to organize separate excursions. The topic of uranium mines is treated by the Department of Mining and is part of the specialisation of Underground Mining.

Overall, the peers confirmed that all curricula allow the students to achieve the intended learning outcomes. The objectives and intended learning outcomes for the degree programmes are systematically substantiated and updated in the individual modules.

For the peers, this assessment is confirmed during the discussion with representatives of the industry who welcomed the development of the programmes during the last decade. Compared to the graduates in the early 2000s the representatives of industry found the actual graduates much better educated. But they noted on the other side that the field specific education could be even better with less focus on philosophy and sociology. On the one hand the peers could follow this statement on the other it seemed that students become more open minded and familiar with other scientific perceptions. The peers assessed it positively that from the view of the labor market students are educated on modern equipment used in industry.

They learned from the discussion that companies need well trained generalists as well as specialists depending on the structure and strategy of the individual company. All representatives of companies were united in the wish that more international aspects should be involved in the programmes because even on the Kazakh national labour market international experience becomes more and more important.

Criterion 1.4 Admission requirements

Evidence:

- Information about the rules and regulations for admission can be found on the website:
- Bachelor programmes: Decree of the Government of the Republic of Kazakhstan No.111 dated January 19, 2012
- Master programmes: Decree of the Government of the Republic of Kazakhstan No.109 dated January 19, 2012

Preliminary assessment and analysis of the peers:

The peers confirmed that the requirements and admission procedures are accessible to all students on the websites; however, the link of the “Rules of admission” leads to a pdf-file in Russian and Kazakh. The peers learned that the selection of the applicants for the Bachelor programmes is made by the Ministry of Education and Science; more specifically, admission for the bachelor degrees is carried out by the admission rule developed by the Ministry of Education and Science of Kazakhstan based on the Decree of the Government of the Republic of Kazakhstan No.111 dated January 19, 2012. Theoretically, any person having general secondary (secondary general), technical and vocational (primary and secondary vocational, post-secondary), higher (higher vocational) education can be

admitted to KazNRTU. Educational grants are awarded to students on a competitive basis in accordance with scores gained on the Common National Testing (CNT) or complex testing. This Common National Testing is being taken by all high school graduates and the score received qualifies a high school graduate to apply for university admission. The Ministry of Education and Science defines the quantity of Educational Grants for each academic degree programme. Altogether, the auditors judged that the admission requirements were reasonable for maintaining the quality of the Bachelor degree programmes.

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

There are no changes of the assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria not completely fulfilled yet with regard to the Lisbon Recognition Convention. Additionally the peers still recommend to offer more opportunities for students to get knowledge of field specific aspects as well as in aspects of sustainability and environment. As well they recommend to offer more opportunities to the students to get practical experiences in general and in the geology programmes students should get more practical experience in field work, especially with different types of mineral deposits.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Module descriptions (as far as available)
- Curriculum / content overview
- Discussions with students and teaching staff

Preliminary assessment and analysis of the peers:

The peers confirmed that all degree programmes had been divided into modules and that each module comprised a sum of teaching and learning. The modules ensure that each module objectives helps to reach both the qualification level and the overall intended learning outcomes. According to the peers, the modularisation and structure of the curricula allow for the completion of the degree programmes in time. The peers also acknowledged that with its choice of modules, the structure ensures that the learning outcomes can be reached and allows students to define an individual focus and course of

study. With regard to the extensive offer of elective courses the peers assessed positively the advices of tutors for the election decisions of the students.

The peers saw that in all programmes the structure of all curricula offer the opportunity for a study abroad. On the other hand they noticed that none of the students who participated in the discussion with the peers had been abroad even though many of them indicated a vivid interest to study at another university. The students admitted that the requirements to qualify for an exchange programme were very difficult to meet. In addition, Kazakhstan is not included in the European Erasmus programme.

In order to realize the vision of KazNRTU to become an internationally recognized institution of Higher Education and to facilitate the mobility of students, the peers recommended to increase the number of international exchange programmes and to offer more opportunities to students to participate in these exchange programmes.

The peers did not see any regulations for the recognition of qualifications gained from other higher education institutions, in particular abroad. According to the Lisbon Convention which is ratified by Kazakhstan each university is asked to recognize activities completed externally unless the HEI can prove that the competencies gained at the other HEI are completely different. From the view of the peers an appropriate supplement of the admission regulations will be necessary.

Criterion 2.2 Work load and credits

Evidence:

- Self Assessment Reports
- Curricular structures
- Module descriptions
- Discussions with students and teaching staff

Preliminary assessment and analysis of the peers:
The peers understood that KazNRTU is using the national credit point system; according to this credit point system one credit point corresponds to one hour of lecture, one hour of structured learning with the teacher and one hour of independent work. Additionally the Kazakh credit-system uses different metrics for certain types of educational work and different types of lectures which explained to the auditors the different numbers of Kazakh credit points in bachelor programmes with the same duration.

KazNRTU turned the Kazakh credit points into the European Credit Transfer and Accumulation System (ECTS) to be able to compare the study attainment and performance of students of higher education with other European countries. When looking at the module

descriptions the peers found inconsistencies in the translation, probably a result of the different metrics of the national credit point system. The peers asked for a transparent translation of the national credit points into ECTS points

The peers learned during the interviews with students that the actual workload and credit points awarded to a module is corresponding in most cases more or less to the programme outline. According to the students the workload is reviewed during the evaluation. In general the auditors found the estimated time budgets realistic enough to enable students to complete the degree without exceeding the regular course duration. The peers compared the workload of the different years and concluded that the number of ECTS points fluctuates around 30 credit points per semester which means a fairly balanced workload for the students. The peers confirmed that no structure related work peaks existed which was also confirmed by the students.

Criterion 2.3 Teaching methodology

Evidence:

- Discussion with teaching staff
- Module descriptions

Preliminary assessment and analysis of the peers:
The module descriptions provided a suitable overview of the "type of teaching" that is applied. The lecturers explained that they use a number of different teaching methods. While a majority of classes is taught in the form of classical lectures and presentations, seminars and a variety of projects especially in the master's degree programmes were also used. This means that students have to carry out projects and present the results at the end of the course.

The auditors appreciated furthermore that students have several possibilities to participate in scientific projects which are financed by the government or private institutions. Even bachelor students are partially involved in research projects.

The auditors welcomed the different teaching methods and concluded that the teaching methods and tools support the achievement of the learning outcomes at the intended level. On the other hand they could follow the wish of the students to have more lectures in English language in order to improve their language skills.

The peers recommend in general to improve the international experience of the students (see also chapter 2.1, above). This includes also access to specific international journals (e.g. Nature, Science, Economic Geology) which are currently not part of the subscription package of the University.

The auditors were impressed that the faculty runs two field camps on its own which ensure that all students get at least basic field experiences. These basic experiences seem to be sufficient for students of the mining or oil and gas programmes. On the other side the peers could follow the wish of geology students to see other mineral deposits as well.

The ratio of taught contact hours to self-study was properly indicated in the module descriptions. The auditors considered the ratio of contact time to individual self-study time to be adequate. Therefore they recommend that students get more practical experience in field work, especially with different types of mineral deposits (see also chapter 1.3, above).

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Discussions with students and teaching staff

Preliminary assessment and analysis of the peers:

The students confirmed that a well-developed system of tutorials was in place and that each student had a scientific advisor who supported him/her in case of problems. Advice was also offered for designing the individual study plan and for selecting the elective courses. In case of need there is individual support for students as well. Namely if there are difficulties to find an internship in the bachelor degrees programmes the department gives support to the students by recommending companies which are cooperating with the university. Overall, students expressed a high level of satisfaction during their discussion with the peers. The auditors could see that sufficient resources were available for offering individual support, supervision and advice to students.

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

There are no changes of the assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria not completely fulfilled yet with regard to the translation of the Kazakh credit point system to ECTS. Additionally, the peers still recommended to strengthen the international experience of students.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Exams[5] are devised to individually measure to which extent students have reached the learning outcomes defined. Exams are structured to cover all of the intended learning outcomes (knowledge, skills and competences). Exams are module-related and offer students continuous feedback on their progress in developing competences.

Evidence:

- Module descriptions
- Self-assessment report
- Discussions with students and teaching staff

Preliminary assessment and analysis of the peers:

The peers were told that examination rules and regulations are in place but they have not been forwarded to the peers yet. The peers kindly ask to submit the examination rules and regulations as additional information.

The peers gained the impression that type, organization and distribution of examinations are designed to support the attainment of the intended learning outcomes. While most exams are in written form, in seminar-type courses students have to carry out projects and present the results at the end of the course.

In general, examinations are organized with midterms and final exams. The peers are in favour of a continuous assessment as it allows students to balance a bad mark and it forces the students to consistently learn during the semester. The different forms of examination were mentioned in the module descriptions. On average, there are six exams per semester. Students who failed exams have the possibility to repeat them either in the following semester or immediately following the semester in the winter or summer session. The degree programmes end with a final thesis that guarantees that students can carry out an assigned task independently and at the level of the qualification sought.

From the view of the auditors the number and distribution of the exams ensure that the exam load and preparation times for the students are adequate. All exams are organised in a way which avoids delays to student progression caused by administrative regulations.

Students confirmed that according to their judgement, exams are marked using transparent criteria and the timeframe for marking exams does not interfere with individual academic progression which means that students can directly move on from the bachelor's to the master's degree programme.

[5] Exams are all methods of ascertaining to which extent the learning outcomes have been reached as well as any pre-examination elements, assignments etc., as set forth by the higher education institution in question.

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

There are no changes of the assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria completely fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Analysis of needs and capacities
- Staff handbook
- List of and information about research projects in the self-assessment report

Preliminary assessment and analysis of the peers:
The University developed from a school for mining and geology. So both fields have a historic base in the strategy of the university. Raw materials is one of the most important fields of Kazakh economy. Therefore, the study programmes are in the centre of the strategic development of the university.

The peers learned that there is a competition of the universities for the best staff members which has its impacts on salary, equipment and staff for professors. Professors have to teach 9 hours per week, lecturers from 12 to 14 hours. The mining programmes comprise 12 professors and 200 teachers including lecturers and external teaching staff. The numbers for the other programmes are similar. From the view of the peers there are sufficient staff resources available for teaching as well as for providing assistance and advice to students and for administrative task.

The peers noticed very positively that the teaching staff becomes younger with an actual average age of 56, compared to an average age of 65 ten years ago.

Overall the peers concluded that the composition of the teaching body is covering all field specific competencies taught in the study programmes. Sometimes also guest lecturers from industrial partners offer lectures to give the students first-hand information of labour market developments. Additionally, foreign guest lecturers are invited regularly and hold English lectures.

The research and development activities carried out by the teaching staff are in line with and support the level of academic qualification aimed at. The auditors wonder that sabbaticals are unknown. At least young teachers have the opportunity to go abroad for research activities.

Criterion 4.2 Staff development

Evidence:

- Self Assessment Report
- Capacity development offers / Further education
- Discussion with lecturers

Preliminary assessment and analysis of the peers:

In line with the Strategy 2020 of KazNRTU and on the basis of Plans developed by all structural divisions of KazNRTU the university developed and approved long-term and annual personnel development plans for faculty and administrative staff. In the frame of the Strategy "Kazakhstan 2050", the Government of Kazakhstan developed a State Programme for Industrial Innovation Development, and KazNRTU was selected for implementation of the research and educational part of this program. KazNRTU provides evidence and figures of further education and didactical training that has taken place recently. Hence, the peers could see that there are offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills. Additionally, the representatives from the management of KazNRTU stressed that more than 400 teachers had received training to improve their English speaking skills. However, when talking to the staff members most of them refused to speak English as they felt that their level of English was not adequate to converse in a proper way.

Criterion 4.3 Funds and equipment

Evidence:

- Self Assessment Report
- Detailed lists of equipment in the self-assessment report
- Visit of laboratories
- Discussion with management and representatives from compagnies

Preliminary assessment and analysis of the peers:

During the discussion with representatives of the management of KazNRTU the peers learnt that 80% of the overall funds for teaching and equipment stem from governmental funds. Additional 20% of the budget is provided by private companies. While the peers

believed that the governmental funding was closely linked to the number of students permitted to the university and the funding was secured for the next years, the peers wondered if the university can count on the resources provided by private companies. Management of the university as well as representatives from business pledged that the partner companies of KazNRTU were highly dedicated to support the university. The university and its partner companies sign long term agreements of three to five years, and the university actively contributes to the technological development of the companies by conducting research projects (final theses). Finally, the peers indicated that they could not really verify this statement but as they understood that the core business was secured they accepted this explanation. The faculty planned to raise up nongovernmental funds to 40% by increasing research activities together with companies.

The peers visited the laboratories for both degree programmes and confirmed that in general the equipment has a sufficient quality for teaching and will be raised up in September 2016. In some cases they asserted that older microscopes still are in use which should be replaced as well. Additionally they saw that some laboratories are very small for the number of students and the equipment does not allow to handle bigger groups of students.

There is electronic access to international journals which are paid by the government for all universities. The peers confirm that the access to international journals is wide but they assert a lack of some fundamental specific journals like “Nature”, “Science”, "Geology" and “Economic Geology”.

Students in general are satisfied with the equipment of the university. They only criticised that the dormitories have not sufficient space for all students.

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

There are no changes of the assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria completely fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions (Syllabus)

Preliminary assessment and analysis of the peers:
The university holds available very detailed descriptions of the single modules in form of syllabuses which are published on the websites in Russian and Kazakh language. They give very detailed information about person(s) responsible for each module, teaching method(s) and work load, credit points, intended learning outcomes, module content, planned use/applicability, admission and examination requirements, form(s) of assessment and details explaining how the module mark is calculated, and recommended literature. The peers got summaries of the descriptions in English language after the on-site visit.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Certificate of study programme
- Transcript of Records of study programme
- Diploma Supplement are missing

Preliminary assessment and analysis of the peers:
The peers understood that after graduation a degree certificate is issued in Russian and Kazakh language. The documents available provide information on the student's individual performance. The individual modules and the grading procedure on which the final mark is based are explained in a way which is clear for third parties. But the peers missed a real diploma supplement which contains detailed information about the educational objectives, intended learning outcomes as well as about the educational system of Kazakhstan. Additionally the auditors missed statistical data as set forth in the ECTS User's Guide are not included in the documents to allow readers to categorise the individual result/degree.

Criterion 5.3 Relevant rules

Evidence:

- No official rules and regulations had been provided

Preliminary assessment and analysis of the peers:
The peers ask the university to provide all study programme and university-wide rules and regulations in English

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

After the audit the university sent English translations of all regulations of the programmes wherein the rights and duties of both the higher education institution and students are clearly defined and binding (guidelines, statutes etc.) so the peers saw that part of the criteria as fulfilled.

There are no further changes of the previous assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria not completely fulfilled yet with regard to a Diploma Supplement.

6. Quality management: Quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self Assessment Report
- Discussion with lecturers and students

Preliminary assessment and analysis of the peers:
The peers were told that according to the development strategy of KazNRTU the university wants to further develop its research competences and its status as a research university. This application implements principles of quality management in accordance with the requirements of the standard ISO 9001-2008 and the standards and guidelines of ENQA. The peers understood that a quality management policy was available in Russian and published on the website. If students have a specific request or a complaint there is a website available to address the management of KazNRTU directly.

The auditors gain the impression that the HEI strives to involve students in the further development of the educational programs. Even if neither the respective processes nor the results are documented within the SAR the peers understand that there are activities in place to evaluate teaching activities and overall study conditions. Specific modules and courses are evaluated on a regular basis. After completion of a module the students are asked to provide an anonymous feedback via an internal online platform. The peers learn on request that the questionnaires are analyzed on a central level. The students have access to the results of the evaluation but there is no direct discussion between the teacher and students.

Furthermore, the peers were informed that a number of different quality measures had been established and were maintained. At the beginning and at the end of each semester a systematic analysis of the educational material and approaches was carried out. This included the critical analysis of the curriculum, working programs of disciplines, teaching materials, practical, laboratory and course work as well as methods of monitoring. The purpose of this exercise was to verify that the material was designed in a way to achieve the intended learning outcomes.

Additionally, the degree of customer satisfaction is determined regularly by the Scientific and Practical Center of Social Monitoring of the University. Internal audits are taking place to monitor the functioning of the quality management system. At the end of each semester, lecturers are assessed by students. The students have to fill in an electronic questionnaire anonymously; the data is analysed and made available to the management and the Head of Department. The respective data is presented in the self-assessment report of KazNRTU. If a lecturer receives a bad evaluation the Head of Department talks to the respective professor and tries to identify the reason for complaints; the professor is supposed to improve the teaching approach. The lecturers do not discuss the results of the evaluation with the students and the students cannot follow up if any changes are actually taking place based on the evaluation. Hence, even though the peers understood that evaluation and monitoring data is collected and analysed systematically, it remained unclear to the peers how this data is actually used to take action to improve the shortcomings that had been identified. Therefore, the peers recommended ascertaining that the feedback loops (e.g. teaching evaluation) are defined and feedback is provided to the students.

The auditors could see that a quality assurance policy and quality assurance procedures were in place.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

There are no changes of the assessment of the peers arising from the comment of the university. They confirm their previous assessment and see the criteria completely fulfilled.

D Additional Documents

Before preparing their final assessment, the panel asks that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

1. Examination Regulation

E Comment of the Higher Education Institution

The university gave a short comment to the report and sent all regulations for the programmes in English translations.

F Summary: Peer recommendations

Taking into account the additional information and the comments given by Satpayev Kazakh National Research Technical University the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	**ASIIN-seal**	**Subject-specific label**	**Maximum duration of accreditaiton**
Ba Geology and Exploration of Mineral Deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ma Geology and Exploration of Mineral Deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ba Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ba Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022

Requirements

A 1. (ASIIN 1.4) Define the rules for the recognition of credits acquired at other higher education institutions in accordance with the Lisbon Recognition Convention.

A 2. (ASIIN 2.2) Ensure the transparency of the translation of the national credit points into ECTS-Points.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well as about the educational system of Kazakh and statistical data according to the ECTS-Users' guide in addition to the final grade.

Recommendations

E 1. (ASIIN 2.1, 2.3) It is recommended to strengthen the international experience of students (more support to their academic mobility, additional access to specific international journals (e.g. Nature, Science, Economic Geology), more lectures, seminars and exercises in English language)

E 2. (ASIIN 1.3) It is recommended to offer more opportunities for students to get knowledge of sustainability and environment.

E 3. (ASIIN 1.3) It is recommended to offer more opportunities for the students to get practical experience in general.

For the Geology Programmes

E 4. (ASIIN 1.3, 2.3) It is recommended that students get more practical experience in field work, especially with different types of mineral deposits. (2 additional weeks, to learn more of the diversified geology of Kazakhstan)

G Comment of the Technical Committee Geosciences

The Technical Committee discussed the report and followed the assessment of the peers without any changes

The Technical Committee 11 – Geosciences proposed the award of the ASIIN seal as followed:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Geology and Exploration of Mineral Deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ma Geology and Exploration of Mineral Deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ba Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ba Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022

H Decision of the Accreditation Committee (01.07.2016)

The Accreditation Committee discussed the report and made some editorial changes for clarifying the circumstances.

The Accreditation Committee decided the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Geology and exploration of mineral deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ma Geology and exploration of mineral deposits	With requirements for one year	EUR-ACE®	30.09.2022
Ba Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Mining Engineering	With requirements for one year	EUR-ACE®	30.09.2022

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022
Ma Oil and Gas Engineering	With requirements for one year	EUR-ACE®	30.09.2022

Requirements

A 1. (ASIIN 1.4) Define the rules for the recognition of credits acquired at other higher education institutions in accordance with the Lisbon Recognition Convention.

A 2. (ASIIN 2.2) Ensure the transparency of the conversion of the national credit points into ECTS-Points.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well as about the educational system of Kazakh and statistical data according to the ECTS-Users‘ guide in addition to the final grade.

Recommendations

E 1. (ASIIN 2.1, 2.3) It is recommended to strengthen the international experiences of students (more support to their academic mobility, additional access to specific international journals (e.g. Nature, Science, Economic Geology), more lectures, seminars and exercises in English language).

E 2. (ASIIN 1.3) It is recommended to offer more opportunities for students to get knowledge of sustainability and environment.

E 3. (ASIIN 1.3) It is recommended to offer more opportunities for the students to get practical experiences in general.

For the Geology Programmes

E 4. (ASIIN 1.3, 2.3) It is recommended that students get more practical experiences in field work, especially with different types of mineral deposits (for example 2 additional weeks, to learn more about the diverse geology of Kazakhstan).

I Fulfilment of requirements (08.12.2017)

Requirements

For all degree programmes

A 1. (ASIIN 1.4) Define the rules for the recognition of credits acquired at other higher education institutions in accordance with the Lisbon Recognition Convention.

Initial Treatment	
Peers	not fulfilled Vote: unanimous Justification: The university did not define adequate regulations yet.
TC 11	not fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment oft he peer group.
2. Round	
Peers	fulfilled Vote: unanimous Justification: The university defined adequate regulations yet rules for the recognition of credits acquired at other higher education institutions. The regulations correspond to the Lisbon Recognition Convention.
TC 11	fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment of the peer group.

A 2. (ASIIN 2.2) Ensure the transparency of the conversion of the national credit points into ECTS-Points.

Initial Treatment	
Peers	not fulfilled Vote: unanimous Justification: The university did not explain the conversion of the national credit points into ECTS-Points.
TC 11	not fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment of the peer group.
2. Round	
Peers	fulfilled

	Vote: unanimous Justification: The university described the transformation of the credit points in a transparent way.
TC 11	fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment of the peer group.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well as about the educational system of Kazakh and statistical data according to the ECTS-Users‘ guide in addition to the final grade.

Initial Treatment	
Peers	not fulfilled Vote: unanimous Justification: The university did not provide diploma supplements for the programmes.
TC 11	not fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment oft he peer group.
2. Round	
Peers	fulfilled Vote: unanimous Justification: The university offers a diploma supplement with the asked information.
TC 11	fulfilled Vote: unanimous Justification: The Technical Committee followed the assessment of the peer group.

Decision of the Accreditation Commission on 30-06-2017:

Degree programme	**ASIIN-label**	**Subject-specific label**	**Accreditation until max.**
Ba Geology and Exploration of Mineral Deposits	All requirements fulfilled	EUR-ACE®	30.09.2022
Ma Geology and Exploration of Mineral Deposits	All requirements fulfilled	EUR-ACE®	30.09.2022

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Mining Engineering	All requirements fulfilled	EUR-ACE®	30.09.2022
Ma Mining Engineering	All requirements fulfilled	EUR-ACE®	30.09.2022
Ba Oil and Gas Engineering	All requirements fulfilled	EUR-ACE®	30.09.2022
Ma Oil and Gas Engineering	All requirements fulfilled	EUR-ACE®	30.09.2022

Appendix: Programme Learning Outcomes and Curricula

According to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Geology and Exploration of Mineral Deposits:

Students should know the following:

- processes and happenings in organic and inorganic nature;
- material composition, structure and development of the Earth crust;
- physical properties of rock and ore deposits formation;
- theory of origin of Earth physical fields (gravitational, electromagnetic, radioactive and thermal), its spatial spread and their relation with structural elements of Earth crust;
- principles of spatial distribution of regional and local elements of Earth crust structure;
- principles of reserves formation and distribution;
- science basis of prognosing mineral resources ;

Students should know and use the following:

- methods of studying and analyzing composition and properties of formation and reserves in subsurface;
- geophysical methods of studying Earth crust, analysis of the research results to define formation and distribution of the reserves;
- essentials of mapping and exploration surveys using distant, drilling, geophysical, hydrogeological, geological, geochemical and laboratory methods;
- practical uses of different types of geological, geophysical and hydrological maps in exploration and prognosing the reserves;
- technical capabilities and requirement for effective use of drilling, geophysical, tunneling and other modern equipment;

-economics essentials, economics and organization of exploration activities in modern world conditions;

-subsurface use, health and safety regulations during geological activities;

- basic programming and programming languages, software oriented on geology and geophysics, and hydrogeological;

Graduates shall be capable of solving the following problems:

in engineering:

- development of rational technologies and methods of geological and geophysical, and hydrogeological surveys using modern equipment and developments for searches of oil, gas fields, underground waters and solid minerals recourses;

-improvement of geological, geophysical, hydrogeological and geoengineering research effectiveness by applying modern equipment and developments;

- rational use of materials, equipment, special measuring and registering facilities, algorithms, software, computer technology on the different stages of exploration survey;

- geological supervision over technological studies of the raw materials under production conditions;

- development exploration survey design specification's production and technical parts;

in service activities;

-geological and geophysical service during production of the reserves;

-geological, geophysical, hydrogeological process service while subsurface use;

during exploration activities:

- participate in choosing geological, geophysical and hydrogeological study methods and ensures their application;

during project design activities:

- use modern information technologies to justify practicability of geological and geophysical, hydrogeological studies and preparation of technical project and programs;

- development of problem solving methods, comparison analysis and work results prognosis;

- justify the sequence of multi-method geological and geophysical studies, and their volume optimization;

- choose the most effective methods of processing and interpretation geological and geophysical data for solving the problems;

during expertise activities:

-in time problem detection during production and research works, define rational solving methods;

- study geological and geophysical science findings, modern technology and equipment;

- implement theoretical developments, improvement of the used technology and methods of interpretation of the data;

- participate in introduction of a new technique, in improvement and experiment of the leading technology of mapping and exploration.

during research activities:

- study geological structure and history of the Earth crust development, geological formation conditions of reserves their distribution and development using modern geological and geophysical methods;

- analysis of geological and geophysical materials to reveal principles of reserves distribution, ore and hydrocarbon genesis;

during organizational and managing activities:

- organises and perform realization of exploration surveys at any stages.

The following **curriculum** is presented:

Cycle	Code	Name	Quantity, credits	Term	Assessing method
1	2	3	4	5	6
GS	**General Studies**		**33**		
SC	**Core Studies**		**33**		
	IK 1101	History of Kazakhstan	3	1	Exam
	Inf 1102	Informatics	3	1	Exam

	OBJ 1103	Health and Safety	2	1	Exam
	Soc1104	Sociology	2	1	Exam
	EUR 1105	Ecology and Sustainable Development	2	2	Exam
	K(R)Ya1106	Kazakh(Russian) language	6	1-2	Exam
	OET 2107	Basic of Economy	2	3	Exam
	IYa 2108	Foreign language	6	1-2	Exam
	OP 2109	Fundamental of Law	2	3	Exam
	Pol 2110	Political Science	2	3	Exam
	Fil1111	Philosophy	3	2	Exam
OS	**Optional Studies**				
GS	**General Studies**		**64**		
CS	**Core Studies**		**20**		
	Mat(I-II)1201	Math I-II	5	1-2	Exam
	Fiz 1202	Physics	5	2-3	Exam
	NGG 1203	Descriptive geometry and computer graphics	3	2	Exam
1	2	3	4	5	6
	GMR 2204	Geology and Mineral Resources of Kazakhstan	3	4	Exam
	PK(R)Ya 2205	Professional Kazakh (Russian) language	2	4	Exam
	P-oIYa 3206	Profession-orientated foreign language	2	6	Exam
OS	**Optional Studies**		**44**		
CS	**Core Studies**		**32**		
AS	**Applied Studies**		**5**		
	GMPI 3301	Geology of Mineral Resources	2	5	Exam
	ON 3202	Subsurface use fundamentals	3	6	Exam
OS	**Optional Studies**		**27**		

Overall		**129**		
ATE	**Additional Type of Education**			
PP	**Professional Practice**	**не менее - 15***		
	Educational			Report
	Internship			Report
	Pre-graduation Paper			Report
PE	**Physical Education**	**8**		
OS	**Optional Studies**			
FA	**Final Assessment**	**3**		
	National Examinationby profession	1	8	
	Writing and defense of Graduation Project (Paper)	2	8	
Overall:		**At least - 155**		

According to the self assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Geology and Exploration of Mineral Deposits:

Students shall know the following:

- modern mapping technologies;
- theoretical basis of geology and research methodology;
- drawing methods of different geological maps and their interpretation;
- skilled to work with geological maps and sections, as well as reserves estimation;
- to be competent in subsoil use respect, ecological exploration, reserves exploration and production, health and safety.

The following **curriculum** is presented:

Cycle	Code	Name	Quantity, credits	Term	Assessing method
GS	**General Studies**		**20**		
CS	**Core Studies**		**8**		
	IFN 5201	History and philosophy	2	1	Exam
	IYa 5202	Foreign language (professional)	2	1	Exam

	Psi 5203	Psychology	2	1	Exam
	Ped 5204	Teaching	2	1	Exam
OS	**Optional Studies**		**12**	1,2,3	
AS	**Applied Studies**		**22**		
SC	**Core Studies**		**2**		
	SPG 5301	Current Issues in Geology	2	2	Exam
OS	**Optional Studies**		**20**	1,2,3	
	Overall of theoretical studies		**42**		
ATE	**Additional Type of Education**		**At least 13**		
P	Practice (research and teaching)		At least 6*	2,3	Report
SSRP	Student Scientific Research Project, including Master's Degree dissertation		At least7	1,2,3,4	Report
FA	**Final Attestation**		**4**		
CE	Complex Exam		1	4	
E&DMDD	Execution&Defense of Master's Degree Dissertation		3	4	
	Overal		**At least 59**		

According to the self assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Mining:

in the field of organizational and managerial activities:

- Participation in the organization of work, aimed at the formation of the creative nature of production teams;

- Development of plans for different types of works and control of their implementation, including the provision of appropriate services necessary technical documentation, materials and equipment;

- Find the optimal solutions for the implementation of works with regard to quality requirements, cost, deadlines, competitiveness and security of life and reliability;

- Technical equipment and organization of workplaces;

- Carry out technical control works;

in the field of industrial and technological activities:

carrying out physical and experimental studies using modern techniques and methods of measuring and processing the results;

the introduction of manufacturing processes, quality control of components and assemblies for various purposes;

calculation of production standards, technological standards of production, selection of standard equipment, a preliminary assessment of the economic efficiency of field development and production of mining operations;

effective use of mining equipment and equipment selection and calculation of parameters of technological processes for ore excavation;

standardization and certification of products of mining production;

environmental control of production;

participate in the work on the exploration and development of mineral deposits;

In the field of experimental research:

measurements and research in the extraction of mineral deposits with a choice of modern technical means and computer processing of the results;

in the field of computational and design and analysis:

- Development of generalized solutions to problems, the analysis of these options, forecasting the consequences of finding compromise solutions in terms multicriteriality, uncertainty, planning and implementation of projects in the development of mineral deposits;

- The use of information technology for the selection of the necessary equipment and technology in the development of mineral deposits and construction of mining enterprises;

in the field of software and management activities:

- Choice of computer technology and equipment for mining;
- The application of computer technology to geo-information systems;
- Information provision devices and systems.

in the field of educational and teaching activities:

- Providing high-quality transmission of skills and knowledge and the ability to work with staff during their training.

The main requirements for the social and ethical competences graduates are:

- To know the social and ethical values based on public opinion, traditions, customs, social norms and be able to navigate to them in their professional activities;
- To know the traditions and culture of the peoples of Kazakhstan;
- To know the basics of the legal system and legislation of Kazakhstan;
- To know the trend of social development.

Requirements to economic, organizational and managerial competencies.

The graduate should:

- Have the basics of technical and economic knowledge, have a scientific understanding of the management, marketing, finance, etc .;
- Be able to express and justify their position on the choice of methods for solving tasks;
- Possess organizational skills, be able to create mobile workgroups to accomplish their goals and to be able to manage such a group, be able to defend their rights and to require them to perform duties;
- Be able to take responsibility for decisions and to defend its position on the organizational and administrative activities.
- Know and understand the objectives and methods of state regulation of the economy.

The following **curriculum** is presented:

List of modules		ECTS- credits					
№	Модуль	MED	Sd	USZ	OaMC	Total, %	Type of exam
Fundamentals of mathematics and natural sciences (MED)							
1	Computer science	3 (6)				2,4	T
2	Biology	1 (2)				0,8	T
3	Mathematics	6 (12)				4,8	T
4	Physics	6 (12)				4,8	T
5	Chemistry	2 (4)				1,6	T
6	Physics rocks	2 (4)				1,6	T
7	The destruction of rocks by explosion	2 (4)				1,6	T
	In total	**22 (44)**				**17,6**	
Fundamentals of special disciplines (SD)							
8	The engineering geodesy		2 (4)			1,6	П
9	Information technology careers		2 (4)			1,6	П
10	Underground mining		2 (4)			1,6	П
11	Basics of algorithms and programming		2 (4)			1,6	T
12	Surveying and geodetic instruments		3 (6)			2,4	П
13	The technology of open cast mining		3 (6)			2,4	T
14	Objects of underground construction		3 (6)			2,4	П
15	The theory of information sys-		4 (8)			3,2	T

	tems						
16	Mining and transport machinery and equipment		3 (6)			2,4	П
17	Geomechanics		3 (6)			2,4	П
18	Basic research		3 (6)			2,4	П
19	Designing complex mining enterprises		3 (6)			2,4	П
20	Technology development fields		3 (6)			2,4	П
	In total		**36 (72)**			**28,8**	
Deepening expertise (DE)							
21	Geometry and subsoil qualimetry			3 (6)		2,4	П
22	GIS technology in surveying			3 (6)		2,4	П
23	Autopsy and systems of open cast mining			4 (8)		3,2	Т
24	Design quarries			3 (6)		2,4	П
25	System development of mineral deposits			4 (8)		3,2	П
26	Bases of designing of mining enterprises			3 (6)		2,4	П
27	Construction technology of mining			4 (8)		3,2	Т
28	Design and construction of underground structures			3 (6)		2,4	П
29	Fundamentals of Project Management			3 (6)		2,4	П
	In total			**30 (60)**		**24**	
Out and metasubject content, including the basics of economics and management at the en-							

terprise (OaMC)							
30	History of Kazakhstan				3 (6)	2,4	Т
31	Philosophy				3 (6)	2,4	Т
32	Foreign language				6 (12)	4,8	У
33	Kazakh				6 (12)	4,8	У
34	(Russian language				2 (4)	1,6	тест
35	Basics of economic theory				2 (4)	1,6	Т
36	Health and BC				3 (6)	2,4	Т
37	Economy, planning and management of mining enterprises				2 (4)	1,6	Т
38	Cultural				2 (4)	1,6	Т
39	Sociology				2 (4)	1,6	Т
40	Law basics				2 (4)	1,6	Т
41	Political science				2 (4)	1,6	Т
42	Basics of economic theory				2 (4)	1,6	Т
	In total				**37 (74)**	**29,6**	
	Total				**125 (250)**	**100**	
	Percentage	**17,6**	**28,8**	**24**	**29,6**	**100**	

According to the self assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Mining:

Master of specialty Mining should perform the following tasks in accordance with the professional activities:

– in the field of experimental research:

- analysis of the problem of research in a given area based on the selection and study of literature and patent sources;

- diagnostics of dynamics and activity facilities (materials, manufacturing processes);
- study of the structure and properties of explosives, their improvement and development of new materials and processes for their manufacture;
- construction of mathematical models, computer simulation to solve the problem;
- measurements and research in the development of new materials and technologies in the mining industry for a given procedure with a choice of modern technical means and computer processing of the results;

– in the settlement and the design and analysis:

- formulation of goals and objectives of the project (program) with given criteria, objective functions, limitations, creation the structure of their relationships, identification the priorities for problem solutions;
- development of field development projects based on mechanical, technological, operational, ergonomic, economic parameters;
- use of information technology for the selection of materials and equipment for the field design and development;

– in industrial and technological activities area:

- carrying out physical and experimental studies using modern methods of measurement and processing of obtained results;
- implementation of production processes, quality control;
- calculation of production standards, technological standards on materials and tools consumption, selection of standard equipment, preliminary assessment of the production operations economic efficiency;
- development of technical tasks and regulations for the explosives manufacture;
- efficient use of materials and equipment, selection and calculation of technological processes parameters;
- participation in development of technological processes in course of work preparation;

– in service - operational activities area:

- setting up, testing and utilization of devices, systems and complexes related to professional activities;

– in installation-setup activities area:

▪ implementation of setting up, experienced testing technology at the laboratory and production;

– in organizational and management activities area:

▪ participation in the work organization, aimed to the formation the creative nature of production teams activity;

▪ Plan development for different types of works and control implementation, including the support of appropriate services with the necessary technical documentation, materials and equipment;

▪ finding the optimal solutions during the work implementation with regard to quality requirements, cost, deadlines, competitiveness, health and safety;

▪ technical equipment and workplace organization;

▪ implementation the works technical control;

– in program-management activities area:

▪ designing the programs of technologies process management at creation of new technologies;

▪ use of computer technologies for geo-information systems;

▪ information support of devices and systems.

– in educational and teaching activities area:

▪ Providing the high-quality transfer of skills and knowledge and ability to work with staff during the teaching.

The main requirements for social and ethic competencies of graduates are:

-The knowledge of social and ethic values based on public opinion, traditions, customs, social norms and ability to orient in these norms in accordance with professional activities;

- observe the business ethics regulations, hold the ethic and legal standards of conduct;

- Be able to orient in different social situations;

- Be able to work in team and hold your point of view;

- To strive for professional and personal growth.

Requirements for the economic, organization and management competencies.

The graduate should:

- Be able to develop the right strategy for set problem solution in order to achieve the best final result;
- Be able to analyze the economic situation on the ground in solving the set problem and choose the optimal strategy from the economic point of view;
- To know the basic rules and norms of scientific labor organization.

The following **curriculum** is presented:

№	Name of the discipline	Amount of credits	Rus lang.	Kazakh	FULL NAME. author
Курс 1 Семестр: Осень					
1	History and philosophy of science	2	+		Teachers section
2	Foreign language	2	+		Rusakova LM
3	Pedagogy	2			Teachers section
4	Psychology	2	+		Teachers section
5	Methodology of science and research methods	3	+		Kuttybaev AE
6	Organization of experimental observations and research on the production	3	+		Abdugalieva GY
7	Scientific substantiation of development of underground space	3	+		Iskakov EE
8	Medelirovanie and optimization of open pit mining	3	+		Mukhamedzhanov EB
9	New technological solutions for mining by underground methods	3	+		Abdraman Sh
10	Basic scientific and technical areas in the building Geotechnology	3	+		Almen TM
11	The research work of a student	1	+		Teachers of the depar
Course 1 Semester: Spring					
1	Organization of research and innovation	2	+		Beysebaev AM
2	Resource-saving technologies in the development of mineral deposits	2	+		Yusupov HA
3	Optimization techniques phased mining of mineral deposits	2	+		Kaliyeva A.IP.
4	Special methods for the development of uranium deposits	3	+		Ahmethanov DK

5	Methods for optimization of mining operations	3	+		Mukhamedzhanov EB
6	Features an open development of complex fields	2	+		Mukhamedzhanov EB
7	Physico-chemical methods of geotechnical design methods	2	+		Aben EH
8	Condition and ways of increasing the efficiency of blasting	2	+		Beysebaev AM
9	Process monitoring quarries	3	+		Mukhamedzhanov EB
10	Manage state of the array in difficult conditions	3	+		Kabetenov T.
11	Systems fastening of developments in the construction of underground structures	3	+		Almenno TM
12	Problems of open development of complex fields	2	+		Kaliyeva AP
13	Special issues airing of mining enterprises	2	+		Choi SV
14	The main directions of improving the technology of construction of underground facilities	2	+		Begalinov A.
15	The research work of a student	1	+		Teachers of the depar
16	Research practice	3	+		Teachers of the depar

Course 2 Semester: Autumn					
1	Methods of a substantiation of design decisions open pit mining	3	+		Yusupov GM
2	Computer-aided design of underground mines	3	+		Baimagambetov B.
3	Manufacturing process simple explosives	3	+		Beysebaev AM
4	Automated geographic information systems in mining	3	+		Mukhamedzhanov EB
5	Project Management in the subsoil	3	+		JJ Sultanbekova
6	Design Methodology quarries	3	+		Moldabaev SK
7	New directions for the design and production of uranium deposits	3	+		Aben EH
8	Methodology of designing of underground construction	3	+		Serdaliev ET
9	Simulation of open development of promising fields	3	+		Moldabaev SK
10	Optimization of process parameters of underground mining	3	+		Eluzah M.

11	Modelling of physical processes in civil engineering	3	+		Alibaev SA
12	Computer-aided design of blasting in quarries	2	+		Mukhamedzhanov EB
13	Special methods for underground mining of ore bodies in difficult conditions	2	+		Abdraman Sh
14	Environmental safety blasting	2	+		Almenno TM
15	Teaching practice	3	+		Teachers of the depa

Course 2 Semester: Spring					
1	Comprehensive exam	1	+		State Attestation Comm sion (SAC)
2	Decoration and protection	3	+		State Attestation Comm sion (SAC)

According to self report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Oil and Gas Engineering:

The bachelor in the specialty 5B070800 – "Oil and gas engineering" has to for a competent and crucial decision of professional tasks:

Have an idea:

- about a state and prospects of development of oil and gas production technologies, about problems of oil and gas production and ways of their decision;
- about bases of design of objects of oil and gas production as technological systems;

know:

- physical processes happening in layer at liquid and gas filtration;
- technology of drilling, washing, fastening and development of wells;
- equipment for construction of oil and gas wells;
- general principles of technology of oil and gas field development;

- bases of the theory of liquid raising on a surface;
- technology of impact on a bottomhole zone of wells;
- technology of collecting oil, gas and water.

to be able:

- to choose the technology of oil and gas field development;
- to project a design of wells;
- to select the equipment and to set the mode of its work at well operation;
- to choose the scheme of oil, gas and water collecting.

have skills:

- control, analysis and regulation of development of oil, gas and gas-condensate fields;
- controls of the drilling rig, operation of a drilling equipment;
- removals and interpretations of characteristics of well work;
- carrying out the complex analysis of a condition (development projects) of oil and gas field development (technical and economic, resource-power, ecological analyses.
- be competent on all questions connected with stages of technological process, safety of work in production, environment protection.

The main requirements to social and ethical competences of the graduate are:

- know the social and ethical values based on public opinion, traditions, customs, public norms and to be able to be guided in them in the professional activity;
- know traditions and culture of the people of Kazakhstan;
- know bases of legal system and the legislation of Kazakhstan;
- know tendencies of social development of society;
- respect the rules of engineering ethics, to own ethical and precepts of law of behavior;
- be able to be guided adequately in various social situations;
- be capable to work in team and to argue the point of view;
- seek to professional and personal growth.

The requirements to economic and organizational and administrative competences.

The graduate has to:

- possess bases of economic knowledge, to have scientific ideas of management, marketing, finance, etc.;
- be able to develop the correct strategy of the solution of objectives for achievement of the best final outcome;
- be able to express and prove the position of selection of solution methods of tasks;
- be able to analyze the economic situation arising at the solution of an objective and to choose tactics, optimum from the economic point of view;
- possess organizing abilities, to be able to create the mobile working groups for performance of goals and to be able to operate such group, to be able to protect their rights and to demand from them performance of duties;
- be able to take the responsibility for decision-making and to defend the position of organizational and administrative activity.
- know and understand the purposes and methods of state regulation of economy;
- know the basic rules and norms of the scientific organization of work.

The specialist in an oil and gas engineering has to possess the following group of competences:

- intellectual;
- social;
- system;
- professional.

The following **curriculum** is presented:

Cycle of disciplines.	Code of disciplines	Names of subjects	semester	quantity of the credits		Lec.	Lab.	Prac.	IWS		Type of control	competences	Chair
				РК	**ECTS**				IWST	IWS			
History-Social module													
Obligatory component													
ООД 1.1.1	IK 1101	History of Kazakhstan	1	3	5	2		1	3	3	П	ОК1	HKaSHD
ООД 1.1.4	Inf 1102	Informatics	1	3	5	2	1		3	3	Т	ОК2	IT
ООД 1.1.5	OBZh1 103	Securing of health and safety	2	2	3	1		1	2	2	Т	ОК9	LS

ООД 1.1.6	Soc 1104	Sociology	2	2	3	1		1	2	2	Т	ОК10	HKaSHD
ООД 2.1.12	OP 2109	Law basics	3	2	3	1		1	2	2	Т	ОК19	HKaSHD
ООД 2.1.9	EUR 1105	Ecology and sustainable growth	3	2	3	1		1	2	2	Т	ОК13	AE
ООД 2.1.10	OET 2107	Foundation of economic theory	3	2	3	1		1	2	2	Т	ОК14	EoI
ООД 2.1.13	Pol 2210	Politology	3	2	3	1		1	2	2	Т	ОК20	HKaSHD
ООД 2.1.11	Fil 1111	Philosophy	3	3	5	2		1	3	3	Т	ОК15	HKaSHD
ДВО	Sat	Satpayev reference	1	1					1	1	Кур. раб.	ОК8	GMaEM
Obligatory component													
		State examination after History of Kazakhstan	2										HKaSHD
Physical and mathematical module													
Obligatory component													
БД 1.2.1	Mat (I) 1201	Mathematic I	1	3	5	2		1	3	3	Т	ОК5	Math
БД 1.2.4	Fiz (I) 1202	Physics I	1	3	5	1	1	1	3	3	Т	ОК6	Ph
БД 1.2.3	Mat (II) 1201	Mathematic II	2	3	5	2		1	3	3	Т	ОК5	Math
БД 2.2.7	Fiz (II) 1202	Physics II	2	3	5	1	1	1	3	3	Т	ОК6	Ph
БД 2.2.10	Mat (III) 2210	Mathematic III	4	4	6	2		2	4	4	Т	ОК5	Math
Obligatory component													
БД 2.2.16	Fiz (III) 2216	Physics III	4	3	5	1	2		3	3	Т	ОК6	Ph
БД 2.2.16.1	PFiz 2216.1	Applied physics	4	3	5	1	2		3	3	Т	ОК6	Ph
БД 2.2.12	TM220 9	Theoretical mechanics	4	3	5	2		1	3	3	Т	ОК21	AMaBM D
БД 2.2.12.1	PM220 91	Applied mechanics	4	3	5	2		1	3	3	Т	ОК21	AMaBM D
БД 1.2.5	NCG 1203	Descriptive geometry and computer graphics	2	3	5	2	1		3	3	П	ОК11	DGaG
БД 1.2.5.1	IG1203	Engineering graphics	2	3		2	1		3	3	П	ОК11	DGaG
Chemistry module													
Obligatory component													
БД 2.2.8	Him (I) 1208	Chemistry I	3	3	5	2	1		3	3	Т	ОК18	Ch
Компонент по выбору													
БД 2.2.13	Him (II) 2211	Chemistry II	4	2	3	1	1		2	2	Т	ОК22	Ch
БД 2.2.13.1	HimNG 2211	Chemistry of oil and gas	4	2	3	1	1		2	2	Т	ОК22	EaSOGF
Module of vocational polylingual training													
Obligatory component													
ООД 1.1.3	K(R)Ya 1106	Kazakh (Russian) language I	1	3	5			3	3	3	У	ОК3	Kl
ООД 1.1.7	K(R)Ya 1106	Kazakh (Russian) language II	2	3	5			3	3	3	У	ОК3	Kl
ООД 1.1.4	IYa 1108	Foreign language 1	1	3	5			3	3	3	У	ОК4	Fl

ООД 1.1.8	IYa 1108	Foreign language 2	2	3	5			3	3	3	У	ОК4	Fl
БД 2.2.6	PK(R) Ya 2203	Professional Kazakh (Russian) language	3	2	3			2	2	2	У	ОК16	DOGF
БД 2.2.7	P-oIYa2204	The professional focused foreign language	3	2	3			2	2	2	У	ОК17	EaSOGF
Geological module													
Component for choice													
БД 2.2.9	OSG 2210	General and structural geology	3	2	3	1	1		2	2	П	ПК2	GMaEM
БД 2.2.9.1	GD 22101	Geodesy	3	2	3	1	1		2	2	П	ПК3	GPh
ПД 2.3.2	GNG2302	Geology of oil and gas	4	3	5	2	1		3	3	Т	ПК5	GPG
ПД 2.3.2.1	NG23021	Oil and gas geology and geochemistry	4	3	5	2	1		3	3	Т	ПК5	GPG
БД 3.2.18.2	PFNGP32182	Petrophysicist of oil and gas layers	5	2	3	1	1		2	2	Т	ОК28	GPG
БД 3.2.18.4	GORNGM32184	Geological bases of development of oil and gas fields	5	2	3	1		1	2	2	П	ПК21	GPG
БД 3.2.18.5	NGPG32185	Oil and gas geology	5	2	3	1		1	2	2	П	ПК22	GPG
Module of oil and gas business													
Obligatory component													
ПД 3.3.3	RGGKM 333	Development of gas and gas-condensate fields	5	2	3	1		1	2	2	Т	ПК6	DOGF
ПД 3.3.5	TTDN335	Technology and technology of oil production	6	3	5	1	1	1	3	3	Т	ПК23	EaSOGF
Component for choice													
ПД 2.3.1	ONGD231	Bases of oil and gas business	3	3	5	1	1	1	3	3	Т	ПК4	EaSOGF
ПД 2.3.1.1	VNGI2311	Introduction to oil and gas engineering	3	3	5	1	1	1	3	3	Т	ПК4	EaSOGF
All-technical module													
Obligatory component													
БД 3.2.14	SM3214	Resistance of materials	5	3	5	1	1	1	3	3	Т	ОК23	AMaBMD
БД 3.2.15	OG3215	General hydraulics	5	2	3	1		1	2	2	Т	ОК 24	LCMH
БД 3.2.16	OKDM3216	Bases of designing and detail of cars	5	3	5	2	1		3	3	Т	ОК 25	AMaBMD
БД 3.2.17	ET3217	Electrical equipment	5	3	5	2	1		3	3	Т	ОК 26	EE
Component for choice													
БД 3.2.18	FJG3218	Physics of liquid and gas	5	2	3	1		1	2	2	Т	ОК 27	DOGF
БД 3.2.18.1	RGP32181	Destruction of rocks when drilling wells	5	2	3	1		1	2	2	П	ПК 19	TaTDW

БД 3.2.18.3	NBA32183	Oil depots and gas station	5	2	3	1		1	2	2	У	ОК 28	CaEGOP
БД 3.2.20	TT3220	Thermodynamics and heating engineer	6	3	5	1	1	1	3	3	Т	ПК 11	MAEPGI
БД 3.2.20.1	TT32201	Thermodynamics and heat transfer in technological processes	6	3	5	1	1	1	3	3	Т	ПК 12	MAEPGI
БД 3.2.19	OT3219	Labor protection	6	2	3	1		1	2	2	П	ПК 10	PCaEGOP
БД 3.2.20	EUP3220	Organization and planning of production	5	2	3	1		1	2	2	Т	ОК 29	EaSOGF
Module of equipment and technologies													
Component for choice													
ПД 3.3.4	BNGS334	Drilling of oil and gas wells	5	3	5	2		1	3	3	П	ПК 8	TaTDW
ПД 3.3.4.1	OREN GM33341	Bases of development of oil and gas fields	5	3	5	2		1	3	3	П	ПК 9	DOGF
ПД 3.3.4.2	MNP 3342	Main oil pipelines	5	3	5	2		1	3	3	У	ПК 9	DOGF
БД 3.2.22	PG3222	Trade geophysics	6	3	5	2		1	3	3	Т	ПК 13	GPh
БД 3.2.22.1	MZGM32221	Monitoring of deposits by geophysical methods	6	3	5	2		1	3	3	Т	ПК 13	GPh
БД 3.2.22.2	MGP32222	Main gas pipelines	6	3	5	2		1	3	3	У	ПК 13 а	PCaEGOP
БД 3.2.23	PG3223	Underground hydromechanics	6	3	5	1	1	1	3	3	Т	ПК 14	DOGF
БД 3.2.23.1	GB32231	Hydromechanics in drilling	6	3	5	2		1	3	3	П	ПК 15	TaTDW
БД 3.2.23.2	NKS32232	Pump and compressor stations	6	3	5	2		1	3	3	П	ПК 16	PCaEGOP
БД 3.2.24	NPO3224	Oil-field equipment	6	2	3	1		1	2	2	П	ПК 17	MAEPGI
БД 3.2.24.1	BO32241	Drilling equipment	6	2	3	1		1	2	2	П	ПК 18	MAEPGI
БД 3.2.24.3	GSGH32243	Gas networks and gas storages	6	2	3	1		1	2	2	П	ПК 19а	PCaEGOP
ПД 4.3.6	EShM436	Operation of offshore fields	7	3	5	2		1	3	3	П	ПК 25	EaSOGF
ПД 4.3.6.1	EGNP4361	Operation of gas and oil pipelines	7	3	5	2		1	3	3	У	ПК 25 а	PCaEGOP
ПД 4.3.6.2	BMS4362	Drilling of sea wells	7	3	5	2		1	3	3	П	ПК 27	TaTDW
ПД 4.3.7	PZNO437	Anticorrosive protection of the oil and gas equipment	7	3	5	2		1	3	3	П	ПК 28	EaSOGF
ПД 4.3.7.1	ZS4371	Completion of wells	7	3	5	2		1	3	3	П	ПК 29	TaTDW
ПД 4.3.7.2	PZSGNPH4372	Anticorrosive protection of constructions ГНПиГНХ	7	3	5	2		1	3	3	П	ПК 29а	PCaEGOP

ПД 4.3.8	RNM 438	Development of oil fields	7	3	5	2		1	3	3	П	ПК 31	DOGF
ПД 4.3.8.1	TBNGS 4381	Technology and technology of drilling of wells	7	3	5	1	1	1	3	3	П	ПК 32	TaTDW
ПД 4.3.8.2	ENG43 82	Operation of oil storages and gas storages	7	3	5	1	1	1	3	3	П	ПК 33	PCaEGOP
Module of technologies and design														
Component for choice														
ПД 4.3.9	SPSP43 9	Collecting and preparation of borehole production	7	3	5	1	1	1	3	3	П	ПК 34	EaSOGF
ПД 4.3.9.1	BTR43 91	Boring and grouting solutions	7	3	5	1	1	1	3	3	П	ПК 35	TaTDW
ПД 4.3.9.2	ENKS4 392	Operation of pump and compressor stations	7	3	5	2		1	3	3	П	ПК 36	PCaEGOP
ПД 4.3.10	RES431 0	Repair of operational wells	7	3	5	2		1	3	3	П	ПК 37	MAEPGI
ПД 4.3.10.1	NB4310 1	The directed drilling	7	3	5	2		1	3	3	П	ПК 38	TaTDW
ПД 4.3.10.2	KRGP 43102	Capital repairs of gas and oil pipelines	7	3	5	2		1	3	3	П	ПК 39	PCaEGOP
ПД 4.3.10.3	EOU43 103	Operation of wells in the complicated conditions	7	3	5	2		1	3	3	П	ПК 40	EaSOGF
ПД 4.3.11	OPR43 11	Development design bases	7	3	5	2		1	3	3	П	ПК 41	DOGF
ПД 4.3.11.1	OPTD4 3111	Bases of design of technology of production	7	3	5	2		1	3	3	П	ПК 42	EaSOGF
ПД 4.3.11.2	OPTB4 3112	Bases of design of technology of drilling	7	3	5	2		1	3	3	П	ПК 43	TaTDW
ПД 4.3.11.3	SAPR4 3113	Systems of the automated design	7	3	5	2		1	3	3	П	ПК 44	PCaEGOP
Physical culture module														
Obligatory component														
ДВО1	FK	Physical culture	1	2								ОК7	PhT
ДВО1	FK	Physical culture	2	2								ОК7	PhT
ДВО1	FK	Physical culture	3	2								ОК7	PhT
ДВО1	FK	Physical culture	4	2								ОК7	PhT
Module of military preparation														
ДВО2	VP	Military preparation	2	2								ОК12	MS
ДВО2	VP	Military preparation	3	2								ОК12	MS
ДВО2	VP	Military preparation	4	2								ОК12	MS
ДВО2	VP	Military preparation	5	2								ОК12	MS

ДВО2	VP	Military preparation	6	2								ОК12	MS
Practice the focused module													
ЦПЗ	UP	Educational practice	2	10								ПК1	professors of chair
ЦПЗ	PP	Work practice 1	4	2								ПК7	professors of chair
ЦПЗ	PP	Work practice 2	6	2								ПК24	professors of chair
ЦПЗ	PP	Externship	8	2								ПК45	professors of chair
Module of total certification													
ДР ДП		Writing and protection of the thesis	8	2	**7**							ПК46	professors of chair
ГАК		State exam in the specialty	8	1	**4**							ПК46	professors of chair

According to self report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Oil and Gas Engineering:

- training of specialists for teaching the corresponding disciplines according to programs of a bachelor degree in the organizations of education;
- training of specialists for work in the research organizations.

Master students are given opportunity of receiving double international qualifications of the master, as a result of continuation of the second year of training at foreign universities - partners of the countries of Western Europe and Russia.

The master student will:

- have fundamental scientific and vocational training;
- own modern information technologies, including methods of receiving, processing and storage of scientific information;
- be able to formulate and solve modern scientific and practical problems;
- plan and message research activities for other scientific specialty;
- teach in higher education institutions;

- successfully to carry out research activity;

- take administrative positions in the industrial sphere.

The following **curriculum** is presented:

Apprenticeship: 2 years Academic Degree: Master of Petroleum Engineering

Cycle of disciplines	Discipline code	Name of disciplines	semester	Total credit number		lecture	laboratory	practice	IWoS		mode of as-	Competence	Corresponding Chair
				RK	ECTS				IWoS	IWoD			
Module of obligatory disciplines													
Obligatory component													
БД 1.2.1	IFN5201	History and philosophy of science	1	2	3	1		1	2	6	O	ОС 1	HKaSHD
БД 1.2.3	Ped 5203	Pedagogics	1	2	3	1		1	2	6	O	ОС 2	HKaSHD
БД 1.2.4	Psi 5204	Psychology	1	2	3	1		1	2	6	O	ОС 3	HKaSHD
БД 1.2.2	IYa 5202	Foreign language (professional)	1	2	3			2	2	6	O	ОС 4	FL
ПД 1.3.1	TDGZhS 5301	Theory of movement of gas-liquid mixes	2	2	**3**	1		1	2	6	O	ПК 4	ESOaGF
Module of equipment and technologies 1													
Elective Component													
БД 1.2.5.1	NORNGM52061	Scientific bases of development of oil and gas fields	1	3	5	2		1	3	9	O	РС 1	DOGF
БД 1.2.5.2	MPSPNO52051	Scientific bases of design of operation of oil fields and gas	1	3	5	2		1	3	9	O	РС 1	ESOaGF
БД 1.2.5.3	NOPRB 52052	Scientific bases of design of the modes of drilling	1	3	5	2		1	3	9	O	РС 1	TaTofDW
БД 1.2.5.4	NOPYGH52053	Scientific bases of design of oil and gas storages	1	3	5	2		1	3	9	O	РС 1	PCaEGOP
БД 1.2.6.1	RMM 5304	Development of marine field	1	3	5	2		1	3	9	O	РС 2	DOGF
БД 1.2.6.2	EMM 53043	Operation of marine field	1	3	5	2		1	3	9	O	РС 2	ESOaGF
БД 1.2.6.3	BMM 53041	Drilling on marine field	1	3	5	2		1	3	9	O	РС 2	TaTofDW
БД 1.2.6.4	STHUMM 53042	System of transportation and storage of hydrocarbons on sea fields	1	3	5	2		1	3	9	O	РС 2	PCaEGOP
Module of equipment and technologies 2													

Elective Component													
БД 1.2.7	RPGS 5207	Drilling on marine field	2	3	5	2		1	3	9	O	PC 5	DOGF
БД 1.2.7.1	OZOZT PVNG5 2071	System of transportation and storage of hydrocarbons on sea fields	2	3	5	2		1	3	9	O	PC 5	ESOaG F
БД 1.2.7.2	TBNNS 52072	Technology of drilling of the inclined directed wells	2	3	5	2		1	3	9	O	PC 5	TaTof DW
БД 1.2.7.3	NPPUN PH5207 3	Norms and rules of design of gas and oil pipelines and oil and gas storage	2	3	5	2		1	3	9	O	PC 5	PCaEG OP
БД 1.2.8.1	RNMM S52081	Development of oil fields of multibottomhole wells	2	3	5	2		1	3	9	O	PC 6	DOGF
БД 1.2.8.2	NTSTD N 5208	New technical means and technologies of oil production	2	3	5	2		1	3	9	O	PC 6	ESOaG F
БД 1.2.8.3	NTSNR S52082	New technical means and technologies of repair of wells	2	3	5	2		1	3	9	O	PC 6	TaTof DW
БД 1.2.8.4	STHUR 52083	System of transportation and storage of hydrocarbons abroad	2	3	5	2		1	3	9	O	PC 6	PCaEG OP
Module of equipment and technologies 3													
Elective Component													
ПД 1.3.2.1	KMPR 5302	Computer modeling of processes of development	2	3	5	2		1	3	9	O	PC 6	DOGF
ПД 1.3.2.2	PEShM 53024	Preparation and operation of offshore fields	2	3	5	2		1	3	9	O	PC 6	ESOaG F
ПД 1.3.2.3	FPSS 53021	Physical processes of construction of wells	2	3	5	2	1		3	9	O	PC 6	TaTof DW
ПД 1.3.2.4	GMNG B 53022	Geodynamic models of oil and gas pools	2	3	5	2	1		3	9	O	PC 6	G of OaG
ПД 1.3.2.5	KRGNP 53023	Capital repairs of gas and oil pipelines	2	3	5	2	1		3	9	O	PC 6	PCaEG OP
ПД 1.3.3.1	TDPG 5303	Technology of production of natural gas	2	3	5	2		1	3	9	O	PC 7	DOGF
ПД 1.3.3.2	USNG M 53025	Hydrocarbonic system of oil and gas fields	2	3	5	2		1	3	9	O	PC 7	ESOaG F
ПД 1.3.3.3	TPZS 53031	Theoretical processes of completion of wells	2	3	5	2		1	3	9	O	PC 7	TaTof DW
ПД 1.3.3.4	KPRRN GM 53032	Complex of exploration of oil and gas fields	2	3	5	2	1		3	9	O	PC 7	G of OaG
ПД 1.3.3.5	PERNK S 53033	Increase of overall performance of pump and compressor stations	2	3	5	2	1		3	9	O	PC 7	ПСмЭ ГГ

Module of equipment and technologies 4													
Elective Component													
ПД 2.3.4.1	MPN 5301	Oil recovery increase methods	3	2	3	1		1	2	6	O	PC 9	DOGF
ПД 2.3.4.2	MPPS 53013	Increase methods	3	2	3	1		1	2	6	O	PC 9	ESOaGF
ПД 2.3.4.3	MPPS 53011	Overall performance of wells	3	2	3	1		1	2	6	O	PC 9	TaTofDW
ПД 2.3.4.4	MPKS 53012	Methods of increase of efficiency of drilling of wells	3	2	3	1		1	2	6	O	PC 9	PCaEGOP
ПД 2.3.5.1	PARNGM 5305	Methods of increase of overall performance of gas and oil pipelines	3	3	5	2		1	3	9	O	PC 10	DOGF
ПД 2.3.5.2	PTDOU 53051	Design and analysis of development of oil and gas fields	3	3	5	2		1	3	9	O	PC 10	ESOaGF
ПД 2.3.5.3	OABS 53052	Design of technologies of production in the complicated conditions	3	3	5	2	1		3	9	O	PC 10	TaTofDW
ПД 2.3.5.4	PMPRNGM 53053	Complications and accidents when drilling	3	3	5	2	1		3	9	O	PC 10	G ofOaG
ПД 2.3.5.5	STEGMH 53054	Forecasting and methods of searches and investigation of hydrocarbons	3	3	5	2		1	3	9	O	PC 10	PCaEGOP
ПД 2.3.6.1	NPPSR 5306	Modern technologies of operation of gas and oil storages	3	3	5	2		1	3	9	O	PC 11	DOGF
ПД 2.3.6.2	NPBNGORK 53061	Oil recovery of layers at a late stage of development	3	3	5	2		1	3	9	O	PC 11	ESOaGF
ПД 2.3.6.3	TBMS 53062	Regulatory legal base of oil and gas branch of RK	3	3	5	2	1		3	9	O	PC 11	TaTofDW
ПД 2.3.6.4	GNG 53063	Technology of drilling of sea wells	3	3	5	2	1		3	9	O	PC 11	G ofOa G
ПД 2.3.6.5	STNKS 53064	Modern geology of oil and gas	3	3	5	2	1		3	9	O	PC 11	PCaEGOP
Module of equipment and technologies 5													
Elective Component													
ПД 2.3.7.1	MMNGP 5307	Mathematical models of oil and gas layers	3	3	5			3	3	9	O	PC 12	DOGF
ПД 2.3.7.2	SMSPU 53071	Modern methods of collecting and preparation of oil and gas	3	3	5	2		1	3	9	O	PC 12	ESOaGF

ПД 2.3.7.3	UPIS 53061	Management of process of a curvature of wells	3	3	5	2	1		3	9	O	PC 12	TaTof DW
ПД 2.3.7.4	GNGO BK 53073	Geology and oil-and-gas content of decantation basins of Kazakhstan	3	3	5	2		1	3	9	O	PC 12	G of OaG
ПД 2.3.7.5	AOBK M 53074	Analysis of decantation basins of Kazakhstan and world	3	3	5	2		1	3	9	O	PC 12	G of OaG
ПД 2.3.7.6	IPTT 53075	Engineering design of pipelines	3	3	5	2		1	3	9	O	PC 12	PCaEG OP Г
ПД 2.3.8.1	INGP 5308	Research of oil and gas layers	3	3	5	2		1	3	9	O	PC 13	DOGF
ПД 2.3.8.2	INGS 53084	Research of oil and gas wells	3	3	5	2		1	3	9	O	PC 13	ESOaG F
ПД 2.3.8.3	USBR 53081	Management of properties of boring solutions	3	3	5	2	1		3	9	O	PC 13	TaTof DW
ПД 2.3.8.4	PZU 53082	Calculation of reserves of hydrocarbons	3	3	5	2	1		3	9	O	PC 13	G of OaG
ПД 2.3.8.5	ITOTH 53083	Information technologies on objects of transport and storage	3	3	5	2	1		3	9	O	PC 13	PCaEG OP
Research module													
Obligatory component													
ГАК 1	NIRM	Research work of the undergraduate	1	1	4							PC 3	Prof.chair
ГАК 2	NIRM	Research work of the undergraduate	2	1	4							PC 3	Prof.chair
ГАК 3	NIRM	Research work of the undergraduate	3	1	4							PC 3	Prof.chair
ГАК 4	NIRM	Research work of the undergraduate	4	4	16							PC 3	Prof.chair
Practice focused module													
Obligatory component													
	IP	Research practice	2	3	**12**							PC 8	Prof.chair
	PP	Pedagogical practice	3	3	**3**							PC 14	Prof.chair
Module of final attestation													
Obligatory component													
ГАК 5	KE	Complex examination	4	1	**4**							PC 15	Prof.chair
ГАК 6	OZMD	Registration and defense of the master thesis	4	3	**11**							PC 15	Prof.chair