



**K.Turysov Institute of Geology and Oil and Gas Engineering
Department of Petroleum Engineering**

**EDUCATIONAL PROGRAM
6B07222 - 'Drilling of oil and gas wells'**

Code and classification of the field of education: 6B072 "Engineering, manufacturing and construction industries".

Code and classification of training areas: 6B072 "Manufacturing and processing industries".

Group of educational programs: B071 Mining and quarrying

NRK Level: 6

ORC Level: 6

Duration of training: 4

Volume of credits: 240

Almaty, 2025

The educational program B071 «Drilling of oil and gas wells»_was approved at the meeting of the Scientific Council of KazNITU named after K.I.Satpayev.

Protocol №17 from «18» 06. 2025 y.

Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of Kazntu named after K.I.Satpayev.

Protocol №7 from «10» 06. 2025 y.

The educational program_6B07222 - ‘Drilling of oil and gas wells’ was developed by the academic committee in the direction of 6B072 «Industrial and manufacturing branches»

Full name	Academic degree/ academic title	Position	Workplace	Signature
Chairman of the Academic Committee:				
Istekova Sara amanzholovna	Doctor of Geological and Mineralogical Sciences	Professor	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Teaching staff:				
Ratov Boranbay Tovbasarovich	Doctor of Technical Sciences	Head of the Department of "Geophysics and Seismology "	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Abetov Auez Egemberlyevich	Doctor of Geological and Mineralogical Sciences	Professor	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Umirova Gulzada Kubashevna	Doctor of PhD	Associate Professor	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Togizov Kuanysh Serikkhanovich	Doctor of PhD	Professor	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Aliakbar Madiyar Manarbekuly	Master of Technical Sciences	Senior lecturer	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Employers:				

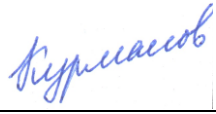
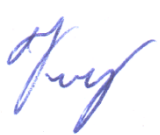
Khitrov Dmitry Mikhailovich	Candidate of Technical Sciences	Manager of the company's data processing center	«PGS Kazakhstan LLP»	
Kurmanov Baurzhan Koptleuovich	Master of Technical Sciences	General manager	OPTIMUM Design Institute LLP	
Students				
Daurbayeva Gulbanu Khamitovna	Master of Technical Sciences	1 st year doctoral student	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Muzapparova Akerke Bakbergenovna	Master of Technical Sciences	1 st year doctoral student	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	
Kirsanova Ekaterina	Master of Technical Sciences	1 st year doctoral student	NJSC "Kazakh National Research Technical University named after K.I.Satpayev"	

Table of contents

List of abbreviations and notations

1. Description of the educational programme
2. Purpose and objectives of the educational programme
3. Requirements for the assessment of learning outcomes of the educational programme
4. Passport of the educational programme
 - 4.1.General information
 - 4.2.Relationship between the achievability of the formed learning outcomes of the educational programme and academic disciplines
5. Curriculum of the educational programme

List of abbreviations and designations

BD – basic disciplines
GOSO – the state compulsory standard of education
DP – documented procedure
UNT – unified national testing
IC – individual curriculum
CTT – credit training technology
CED – catalog of elective disciplines
MEP – modular educational program
RW – research work
R&IA - research and innovation activities
RWS – research work of students
GED – general education disciplines
EP – educational program
PD – profile disciplines
PC – personal computer
TS – teaching staff
RK – Republic of Kazakhstan
WC – working curriculum
QMS – quality management system
IWS – independent work of students
IWSUGT – independent work of students under the guidance of a teacher
SC – standard curriculum
TSS – training and support staff
EMCD – educational and methodical complex of disciplines
EMC – educational and methodological council
EMW – educational and methodical work
EEM – electronic educational materials

1. Description of the educational program

The Bachelor's degree programme 6B07222 - 'Drilling of oil and gas wells' is developed within the framework of the training direction 6B072 'Production and Manufacturing Industries'. It is aimed at training specialists with in-depth knowledge in the field of oil and gas well drilling. The programme includes the study of modern methods of geological exploration, as well as technologies used to find, evaluate and develop oil and gas fields.

Students will become familiar with advanced geophysical, geochemical and hydrogeological methods used in the oil and gas industry. Important attention is paid to mastering the technologies of drilling vertical, directional and horizontal wells, as well as well completion and application of modern technologies in drilling. Special attention is paid to environmental protection and rational use of natural resources in oil and gas exploration.

Graduates of the programme will be prepared to conduct geological studies of oil and gas fields, analyse geological and field data, design and carry out drilling operations, and assess the economic feasibility of developing oil and gas resources.

The Bachelor's programme in direction 6B07222 - 'Drilling of oil and gas wells' provides:

a) Training of specialists in geological exploration, prospecting, evaluation and development of oil and gas fields, capable of effectively solving problems related to drilling and development of hydrocarbon resources.

b) Obtaining fundamental knowledge of the geological structure of the Earth, regularities of formation and location of oil and gas fields, as well as the conditions affecting the accumulation and distribution of hydrocarbons in the subsurface.

c) Acquisition by bachelors of knowledge and modern ideas about methods and technologies of oil and gas exploration, including geophysical, geochemical and drilling methods; about the principles of geological modelling and evaluation of hydrocarbon reserves, as well as about the technologies used in the construction and operation of drilling wells.

d) Acquisition by students of a set of knowledge on drilling and well testing technologies, methods of sample analysis and interpretation of the obtained data, as well as on the principles of organisation and conduct of exploration works at various stages, including all types of works related to drilling and completion of wells (vertical, directional and horizontal).

e) Knowledge of modern equipment and software used for geological studies of oil and gas fields, including data processing and analysis, and used in drilling and well control processes.

Education Programme 6B07222 - 'Drilling of oil and gas wells' aims to prepare professionals with the professional skills and competencies required for a successful career in various sectors related to exploration, drilling and development of hydrocarbon resources. Graduates of the programme will be able to:

Work in oil and gas companies: Plan and conduct oil and gas exploration activities, supervise drilling and completion processes, analyse geological and field data, participate in the evaluation of hydrocarbon reserves, and ensure environmental compliance in the development of oil and gas fields.

Work in research institutes: Conduct scientific research in the field of oil and gas geology, geophysics and oil and gas field development, develop new methods and technologies for hydrocarbon exploration, and participate in scientific projects aimed at studying the geological structure and resources of hydrocarbon deposits.

To work in government organisations regulating the oil and gas industry: To manage and control the use of oil and gas resources, to develop a regulatory and legal framework in the field of geology and mining, and to ensure the rational and sustainable use of hydrocarbon resources in accordance with environmental standards and requirements.

In addition, the programme aims to develop the following competencies in students:

Analytical skills: The ability to analyse geological, geophysical and field data, make reasonable conclusions and make decisions based on the obtained information in the context of exploration and development of oil and gas fields.

Technical skills: Possession of modern methods and technologies of geological exploration,

drilling and well completion, ability to work with modern drilling equipment, geodetic and mining-geological equipment and software used in the oil and gas industry.

Communication skills: Ability to interact effectively with other specialists, to present the results of his/her research and work in the form of reports and presentations on oil and gas exploration and development.

Responsibility: Understanding of the importance of compliance with environmental regulations and requirements for environmental protection during exploration and operation of oil and gas wells.

Thus, the 6B07222 - 'Drilling of oil and gas wells' programme provides graduates with the comprehensive training necessary for successful professional activity and further development in the field of geology and oil and gas drilling technology.

Professors from leading Universities near and far abroad, experts from production companies and research institutes are invited to give lectures and consultations on modern problems of well drilling.

Students undergo training practice at the own polygon 'Burovik' in Kapshagai.

Industrial practice on the programme 6B07222 - 'Drilling of oil and gas wells' is carried out in various organisations engaged in geological exploration, extraction of mineral resources, as well as in research and state institutions specialising in the study of subsoil and management of natural resources.

Among the organisations where students can undergo industrial practice are the following: Kazgeologiya LLP, National Geological Exploration Company Kazgeoengineering JSC, ArcelorMittal Temirtau JSC, Kazakhmys JSC, Eurasian Group JSC, Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, Committee of Geology and Subsoil Use of the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, RSE Kazvodkhoz, and others. Organisations drilling wells for geological exploration, oil and gas production and other purposes.

As part of the industrial practice, students gain practical work experience at oil and gas enterprises, including drilling and completion of wells. They participate in drilling oil and gas wells, core and fluid sampling, as well as conducting geophysical research in wells, geological and technical control over the drilling process and well testing.

Industrial practice allows students to apply their theoretical knowledge in practice, acquire the necessary professional skills related to oil and gas drilling, and establish contacts with potential employers in the oil and gas industry.

The best students can get the opportunity to study under the academic mobility programme in the world's leading universities specialising in oil and gas.

Graduates of educational programme 6B07222 - 'Drilling of oil and gas wells' receive the qualification of Bachelor of Engineering and Technology (with specification of specialisation, e.g. 'in the field of oil and gas business') and can hold various positions in organisations related to exploration, drilling and development of oil and gas fields.

Possible jobs and positions: geological technician in the oil and gas industry, well drilling and completion specialist, geological and technical drilling control specialist, environmental monitoring specialist in the oil and gas industry, drilling technologist, drilling fluids specialist, drilling engineer, well testing engineer, oil and gas production engineer, drilling project management specialist.

Area of professional activity:

The field of professional activity of a bachelor on the programme 6B07222 - 'Drilling of oil and gas wells' includes a set of technologies, means, ways and methods aimed at: studying the geological structure of the Earth's crust in the context of oil and gas bearing basins and prospects of oil and gas content; search and exploration of oil and gas fields, including the use of modern geophysical, geochemical and drilling methods; evaluation of hydrocarbon resources reserves; technologies of drilling and completion of wells for various purposes (vertical, inclined-

Introduction of innovative developments in oil and gas exploration and drilling.

The key role of specialists in this field is to:

- Ensuring the resource base of hydrocarbon raw materials.
- Rational utilisation of oil and gas resources.
- Ensuring environmental safety during exploration, drilling and production operations in the oil and gas industry.
- Implementation of modern technologies in the processes of exploration, drilling and development of oil and gas fields.

Thus, the area of professional activity of a Bachelor in the programme 6B07222 - 'Drilling of oil and gas wells' is multifaceted and covers a wide range of tasks related to the study, exploration, evaluation, drilling and development of oil and gas fields, as well as the introduction of innovative technologies in the oil and gas industry.

Objects of professional activity:

The area of professional activity of a bachelor on the programme 6B07222 - 'Drilling of oil and gas wells' includes the study and use of the following objects and processes:

- Designing and planning of drilling works: development of technical solutions for well construction, drawing up drilling plans and schemes.
- Drilling operations implementation: control over drilling parameters, drilling equipment management, observance of technological modes, risk management.
- Completion of wells: well preparation for operation, cementing, hydraulic fracturing and other hydrocarbon stimulation works.
- Geological and geophysical drilling support: geological and technical control, interpretation of geophysical data, adjustments to the drilling process.
- Drilling fluids management and quality control: selection of formulations and maintenance of required drilling fluid parameters, waste utilisation.
- Use of modern technologies and software: application of automated drilling control systems, use of digital technologies for data analysis and process optimisation.
- Innovative activities: implementation of new methods, technologies and materials to improve the efficiency of drilling operations.

The subjects of professional activity are:

- The subjects of professional activity of a bachelor on the programme 6B07222 - 'Drilling of oil and gas wells' are:
 - Development and optimisation of technological drilling processes for different geological conditions and well types.
 - Management of drilling processes to ensure their efficiency, safety and cost-effectiveness.
 - Analysis and interpretation of data for making sound technical decisions in the drilling process.
 - Application of modern methods and technologies in drilling and completion of wells.
 - Ensuring quality well construction in accordance with the requirements of project documentation.
 - Solving technical problems and troubleshooting during drilling and well operation.
 - Implementation of innovative technologies to improve the efficiency of drilling operations.
 - Assessing and managing risks in the drilling process.

Сферами профессиональной деятельности бакалавра являются:

1. Oil and gas production companies:

- Drilling divisions: Planning, organisation and control of drilling operations, participation in the well construction process.
- Technological departments: Development of technological regulations, optimisation of drilling processes, implementation of new technologies.
- Geological Services: Geological support of drilling, data interpretation, assessment of oil and gas prospects.
- Well operation departments: Completion, testing, well operation, equipment maintenance.

Service companies providing services in the oil and gas industry:

- Drilling companies: Drilling operations, maintenance of drilling equipment.

- Drilling support companies: Geological and technical support, geophysical research in wells.
- Well Servicing Companies: Cementing, hydraulic fracturing, well workovers.
- Drilling equipment and materials production and sales companies: Development, production, sales and service of drilling equipment and materials.

Types of professional activity:

Types of professional activities of a Bachelor graduate are quite diverse and depend on his/her specialisation, qualification and field of work. Here are the main types of professional activities that can be carried out:

1. Technological activity:

Description: This type of activity is related to direct participation in technological processes used in drilling oil and gas wells. It involves the practical application of knowledge and skills related to drilling, completion and well operation technology.

Specific tasks and functions:

Development and implementation of drilling technological processes taking into account geological and technical conditions.

Selection and application of optimal drilling and completion methods.

Control of drilling parameters (pressure, flow rate, rate of penetration, etc.).

Control of technological processes during running and lifting operations, well fastening and cementing.

Working with drilling fluids: preparation, parameter control, maintenance, utilisation.

Participation in well testing and commissioning operations.

Technological control of drilling equipment and tools.

Optimisation of drilling processes to improve their efficiency and safety.

Compliance with labour, industrial and environmental safety requirements.

2. Organisational and management activities:

Description: This activity focuses on organising, planning and managing drilling related processes and resources. It includes the ability to supervise personnel, coordinate work, plan resources and ensure that tasks are accomplished.

Specific tasks and functions:

Planning and organising drilling operations in accordance with project documents.

Managing drilling crews and other specialists involved in the drilling process.

Coordination of work between different services and departments.

Allocation of resources (materials, equipment, personnel).

Maintaining technical and reporting documentation.

Managing risks and ensuring safety of drilling operations.

Development of schedules and work plans.

Monitoring of work performance and compliance with deadlines.

Participation in the development and implementation of measures to improve work efficiency.

3. research and development activities:

Description: This type of activity is related to the search for new knowledge, development of new technologies and methods in the field of oil and gas drilling. It includes conducting research, analysing data and developing innovative solutions.

Specific tasks and functions:

Participate in scientific research to improve drilling processes.

Developing new drilling technologies and materials.

Analysing and interpreting scientific and technical data.

Conducting laboratory studies and experiments.

Studying rock and fluid properties.

Development of new drilling techniques and recommendations.

Participation in scientific and technical conferences and publication of scientific articles.

Implementation of scientific research results into practice.

4. Control activities:

Description: This type of activity is related to ensuring compliance of the performed works with the requirements of technical regulations, standards and design documentation. It includes verification of quality, safety and efficiency of drilling processes.

Specific tasks and functions:

Control over compliance with technological drilling regimes.

Quality control of drilling muds and plugging materials.

Control over compliance with industrial and environmental safety requirements.

Verification of compliance of performed works with the requirements of project documentation.

Analysing drilling results and identifying deviations.

Participation in audits and inspections.

Development of corrective and preventive actions.

Maintaining reports on control results.

5. Specialised Activities:

Description: This type of activity includes highly specialised areas requiring advanced knowledge and skills, such as complex drilling, downhole geophysical surveys, mud management, well completion and stimulation.

Specific tasks and functions:

Specialised drilling: drilling directional and horizontal wells, drilling wells with large deviations from vertical.

Geophysical well logging: logging, interpretation of logging data.

Drilling Fluids Management: formulation development, parameter control, drilling fluids problem solving.

Completion and stimulation of wells: performing cementing, cementing, fracturing, bottom-hole treatment.

Drilling project management: planning, coordination, control, budgeting.

These activities may be performed either on drilling sites or in offices, depending on the position and the duties performed.

2. Purpose and objectives of the educational programme

The Department of Petroleum Engineering carries out educational activities in the direction of training in the Bachelor's programme 6B07222 - 'Drilling of oil and gas wells'. The department plans to train bachelors-drillers of a wide profile for professional activity in the following theoretical and applied directions in the field of oil and gas drilling:

- Technologies of oil and gas well drilling: Study of modern technologies of drilling wells for various purposes, including vertical, directional and horizontal drilling, as well as drilling in complicated conditions and multilateral drilling.

- Equipment and tools for drilling oil and gas wells: Mastering the principles of operation and maintenance of drilling equipment and tools, including drilling rigs, drill pipe, drill bits, casing, and auxiliary equipment used in the oil and gas industry.

- Drilling fluids and flushing fluids for oil and gas wells: Study of the properties and applications of various types of drilling fluids and methods of controlling their parameters for different rock types and well conditions.

- Geological support of oil and gas well drilling: Understanding the geological structure of the subsurface in oil and gas bearing areas, assessing geological risks in drilling and developing measures to minimise them, identifying prospective zones for drilling.

- Hydrogeological aspects of oil and gas drilling: Study of the hydrogeological conditions of the drilling area and methods of controlling water penetrations in wells, as well as analysis of formation waters and their influence on drilling processes.

- Fastening of oil and gas wells: Mastering methods of securing well walls with casing and cement slurries to ensure well strength and tightness.
- Complications in drilling oil and gas wells and methods of their elimination: Studying the causes of complications in drilling (seizures, collapses, sinking, gas and oil-water seepage) and methods of their elimination in the conditions of drilling oil and gas wells.
- - Organisation and Management of Drilling Operations in the Oil and Gas Industry: Mastering the methods of planning, organisation and management of drilling operations, management of drilling crews and projects.
- - Economics of oil and gas drilling: Understanding the economic aspects of drilling and methods of assessing the efficiency of drilling operations in the oil and gas industry, cost analysis, capital investment optimisation.
- - Occupational Health and Safety in Oil and Gas Drilling: Study of occupational health and safety requirements for drilling operations, assessment of occupational risks and development of measures to reduce them.
- - Environmental safety in oil and gas drilling: Understanding the environmental impacts of drilling and methods of minimising them, including waste management techniques and minimising negative environmental impact.
- - Oil and Gas Exploration and Development: Explore methods of prospecting, exploration and development of oil and gas fields, including stimulation and secondary enhanced oil recovery techniques.

The goals and objectives of the presented educational programme are formulated taking into account the requirements and demands of potential consumers, as well as based on the assessment of the demand for this educational programme, which is determined by the interests of potential employers, students, the potential of the university, the requirements of the state and society as a whole.

This programme is aimed at training highly qualified drilling specialists who are able to work effectively in various industries where well drilling is required and solve complex technical problems. Graduates of the programme will have both theoretical knowledge and practical skills necessary for a successful career in drilling.

Purpose of the OP: Training of highly qualified specialists in the field of oil and gas well drilling, possessing theoretical knowledge and practical skills for the effective design, organization and execution of drilling operations, with an emphasis on safety, environmental sustainability and minimization of environmental impacts based on skills in working with modern drilling technologies, analysis of geological and engineering data and independent solution of complex problems, taking into account the principles of sustainable use of natural resources, compliance with international environmental standards and inclusive education

OP objectives:

I. Common tasks:

Common objectives define the common goals that the program seeks to achieve in training highly qualified professionals capable of successfully working in the oil and gas industry.

Formation of fundamental knowledge: To provide students with solid fundamental knowledge in natural sciences, mathematics, and engineering necessary to understand the processes and technologies of oil and gas drilling.

Provide knowledge in the field of oil and gas geology, geophysics, and hydrogeology necessary for the effective development of oil and gas fields.

Development of professional competencies: To develop students' professional skills necessary to perform engineering, technological and managerial tasks in the field of oil and gas drilling.

To develop students' ability to apply the acquired knowledge in practice when solving specific production tasks

Ensure that graduate training meets the requirements of employers and professional standards.

Development of general competencies:

To develop students' analytical and critical thinking, the ability to learn independently and adapt to changes in the professional environment.

To develop teamwork skills, communication skills and ethical standards of professional activity.

To form responsibility for the results of their work and the desire for continuous professional development. Fostering environmental responsibility:

To form students' understanding of the importance of environmental protection and the rational use of natural resources.

To teach students how to apply safe drilling technologies and methods that minimize the negative impact on the environment.

To form an ecological culture and an understanding of responsibility for the consequences of their professional activities.

II Special tasks:

Special tasks define specific goals directly related to oil and gas drilling and the training of specialists in this field. Mastering drilling technologies:

To provide students with in-depth knowledge and skills in the field of oil and gas drilling technologies of various types and purposes (vertical, directional, horizontal, multi-hole).

To teach students how to plan, design and implement drilling processes taking into account geological and technical conditions.

To ensure the ability to choose optimal drilling methods, technological modes and equipment for solving specific tasks.

Knowledge of drilling equipment and tools:

To provide students with knowledge about the principles of operation, design, operation and maintenance of modern drilling equipment and tools.

To teach students how to select, apply, and maintain various types of equipment used in oil and gas well drilling.

Mastering the methods of drilling process management:

To teach students how to control drilling parameters, ensure the safety and efficiency of drilling operations.

To develop the skills to manage drilling crews and ensure the fulfillment of assigned tasks.

Develop risk management skills and respond to non-standard situations during the drilling process.

In-depth study of drilling fluids:

To provide students with knowledge about the properties, composition and application methods of various types of drilling fluids.

To teach students how to select, prepare, control parameters and dispose of drilling fluids.

To create an understanding of the importance of drilling fluids to ensure successful and safe drilling.

Mastering the methods of fastening wells:

To provide students with knowledge about the methods of fastening the walls of wells with casing pipes and cement mortars.

To teach students how to choose optimal fastening methods, carry out well cementing work and control the quality of fastening.

Preparing for work in the face of complications:

To provide students with knowledge about the causes of complications during drilling (snags, collapses, absorption, gas and oil phenomena).

To teach students to recognize complications, take measures to eliminate and prevent them.

Formation of research skills:

To teach students how to analyze geological, geophysical and field information.

To develop skills in using modern methods and technologies for scientific and technical research in the field of oil and gas drilling.

To develop the ability to develop innovative solutions and put them into practice.

Ensuring economic efficiency:

Teach students to analyze the economic aspects of drilling operations, optimize costs, and evaluate the effectiveness of drilling projects.

To form an understanding of the importance of economically sound drilling solutions.

These general and special tasks together provide the training of qualified specialists who are able to successfully solve complex tasks related to the exploration, drilling and development of oil and gas fields.

3. Requirements to the assessment of learning outcomes of the educational Program

The graduate of this educational program is awarded the academic degree of Bachelor of Engineering and Technology.

- A graduate of the Department of Petroleum Engineering in the Bachelor's degree program 6B07222 - "Drilling of oil and gas wells" should know:

1. General principles of assessment:

- **Objectivity:** Assessment should be based on clear criteria and not depend on the subjective opinion of the teacher.
- **Systematic:** Assessment should be carried out throughout the entire period of study, including ongoing monitoring, intermediate and final attestations.
- **Comprehensive:** The assessment should cover all types of educational activities: classroom activities, practical work, laboratory work, independent work, research work and industrial practice.
- **Differentiation:** The assessment should take into account the individual achievements of students and the level of their mastery of the educational program.
- **Transparency:** The assessment criteria should be known to the students in advance, before the start of the assessment activities.
- **Compliance:** The assessment must comply with the requirements of educational standards and the objectives of the educational program.
- **Using different methods:** Evaluation should be carried out using a variety of methods and forms of control, such as written papers, oral responses, testing, practical assignments, project defense, presentations, practice reports, etc.

2. Evaluation criteria:

- **Knowledge:** Assessment of the depth and scope of theoretical knowledge, understanding of basic concepts, principles, patterns, methods and technologies in the field of oil and gas drilling.
- **Skill:** Assessment of the ability to apply the acquired knowledge in practice to solve specific production tasks, perform technological operations, work with equipment and tools.
- **Skills:** Assessment of developed practical skills such as:
 - ♣ Analysis of geological and field information.
 - ♣ Design and planning of drilling operations.
 - ♣ Management of drilling processes.
 - ♣ Work with drilling equipment and tools.
 - ♣ Monitoring of drilling parameters.
 - ♣ Drilling fluid management. Carrying out work on completion and testing of wells.
 - ♣ Analysis and elimination of drilling complications.
 - ♣ Ensuring safety and environmental protection.
- **Competencies:** Assessment of the level of formation of professional competencies, including the ability to:

- ♣ Solve engineering problems in the field of drilling.
- ♣ Apply modern methods and technologies.
- ♣ Analyze the economic efficiency of drilling operations.
- ♣ Work in a team and make decisions.
- ♣ Learn independently and adapt to changes.
- ♣ To observe the ethical standards of professional activity.

- Independence: Assessment of the ability to independently plan, organize and carry out educational and research work.

- Creativity: Assessment of the ability to apply creativity in solving complex problems, to develop new solutions and proposals.

3. Forms of control and evaluation:

o Current control:

- Surveys (oral, written).
- Control work (tests, tasks).
- Abstracts and essays.
- Practical work and laboratory classes.
- Reports on independent work.

o Intermediate certification:

- Exams (written, oral).
- Credits (practical, theoretical).
- Protection of term papers (projects).

o Final certification:

- Final qualifying work (bachelor's thesis).
- Protection of the final qualifying work.
- State exam (if available).

o Assessment of practice:

- Production practice report.
- Description from the head of the practice.
- Protection of the practice report.

o Evaluation of research work:

- Scientific publications.
- Participation in scientific and practical conferences.
- Research reports.

4. 4. Assessment criteria on the scale:

a. Excellent: The student demonstrates deep and complete mastery of the material, the ability to apply knowledge in practice, developed skills and competencies, as well as independence and creativity.

b. Good: The student demonstrates good mastery of the material, the ability to apply knowledge in practice, developed skills and competencies, but It may contain some inaccuracies or omissions.

c. Satisfactory: The student demonstrates a minimum level of mastery of the material, knows how to apply knowledge in typical situations, has skills and competencies, but may make mistakes and inaccuracies.

d. Unsatisfactory: The student has not mastered the material, does not know how to apply knowledge in practice, does not have developed skills and competencies.

5. Ensuring the quality of assessment:

- a. Development and continuous improvement of assessment tools and techniques.
- b. Conducting regular analysis of learning outcomes and making adjustments to the learning process.
- c. Improving the skills of teachers in the field of assessment of learning outcomes.
- d. Using modern technologies and information systems to automate assessment processes.

Conclusion:

The presented requirements for the assessment of learning outcomes ensure an objective and comprehensive assessment of the knowledge, skills, and competencies acquired by students during their studies in the Oil Drilling educational program. They are aimed at training qualified specialists who are able to work successfully in the conditions of the modern oil and gas industry.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	Code and classification of the field of education	6B07 "Engineering, manufacturing and construction industries".
2	Code and classification of training areas	6B072 "Manufacturing and processing industries".
3	Group of educational programs	B071 Mining and quarrying
4	Name of the educational program	6B07222 - "Drilling of oil and gas wells"
5	Brief description of the educational program	It is intended for the implementation of specialized bachelor's degree training in the educational program "Oil Drilling" at Satbayev University. The educational program trains highly qualified specialists in the field of oil and gas drilling who are able to efficiently and safely explore, develop and operate hydrocarbon deposits using modern technologies and observing the principles of environmental responsibility. The program trains specialists who are able to design, plan and carry out drilling operations taking into account geological and technical conditions. The educational program provides training for highly qualified and competitive specialists who are in demand on the labor market in the oil and gas industry. The program combines fundamental education with practical training, which allows graduates to successfully solve complex problems and contribute to the development of the oil and gas sector. • Training of highly qualified specialists in the field of oil drilling with theoretical knowledge and practical skills for effective design, organization and execution of drilling operations, as well as to ensure the safety and environmental sustainability of hydrocarbon extraction processes. The program is aimed at developing students' skills in working with modern drilling technologies, analyzing geological and engineering data, as well as developing the ability to solve complex problems in a dynamically developing oil and gas industry.
6	Purpose of (EP)	Training of highly qualified specialists in the field of oil and gas well drilling, possessing theoretical knowledge and practical skills for the effective design, organization and execution of drilling operations, with an emphasis on safety, environmental sustainability and minimization of environmental impacts based on skills in working with modern drilling technologies, analysis of geological and engineering data and independent solution of complex

		problems, taking into account the principles of sustainable use of natural resources, compliance with international environmental standards and inclusive education
7	Type of EP	New
8	The level of the NRK:	6
9	ORC Level:	6
10	Distinctive features of the EP	no
11	List of competences of the educational programme: General Cultural Competences (GC): GC-1 Ability for abstract thinking, analysis and synthesis GC -2 Readiness for self-development, self-education and professional development. GC -3 Ability to communicate orally and in writing in native and foreign languages. GC -4 Ability to work in a team, willingness to cooperate, manifestation of leadership qualities. GC -5 Ability to think critically and make informed decisions. GC -6 Awareness of the social significance of one's future profession and responsibility for its results. GC -7 Ability to adapt to changing conditions of professional activity. GC -8 Ability to use information technology, including information retrieval, processing, and storage skills. GC -9 Understanding the value and significance of cultural diversity, readiness for intercultural interaction. General professional competences (GPC): GPC-1 is the ability to apply knowledge of natural science and mathematical disciplines in professional activities: The ability to use fundamental knowledge in mathematics, physics, chemistry, geology and other natural sciences to solve engineering problems that arise when drilling oil and gas wells. GPC -2 is the ability to use the basic laws of mechanics, hydraulics, thermodynamics and electrical engineering in solving engineering problems: The ability to apply the basic principles of mechanics, hydraulics, thermodynamics and electrical engineering to understand the processes occurring during drilling, equipment operation, as well as to design technical solutions. GPC -3 is the ability to use modeling and mathematical analysis methods to solve professional problems: The ability to apply mathematical methods and computer tools to create models, analyze data, and solve engineering problems related to oil and gas well drilling. GPC -4 Ability to conduct experiments, analyze and interpret their results: The ability to plan, conduct and analyze the results of experiments necessary to study the properties of materials, technological processes and solve research problems in the field of drilling. Professional Competencies (PC): PC 1 Ability to design and plan drilling operations: The ability to develop projects for the construction of wells for various purposes, make plans and schedules for drilling operations, determine the necessary resources and equipment. PC 2 is the ability to provide technological support for drilling: The ability to control drilling parameters, choose optimal operating modes, ensure the quality of drilling operations and compliance with technological regulations. PC 3 Ability to work with drilling equipment and tools: The ability to select, operate, maintain and repair modern drilling equipment and tools, including drilling rigs, drill pipes, chisels, casing pipes and other equipment. PC 4 The ability to apply drilling fluids and manage their parameters: The ability to select, prepare, maintain, control parameters and dispose of various types of drilling fluids, ensuring efficient and safe drilling. PC 5 The ability to carry out work on fixing wells: The ability to choose the optimal methods of fixing the walls of wells with casing pipes and cement mortars, to control the quality of cementing. PC 6 Ability to carry out work on completion of wells: The ability to choose methods of completion of wells depending on geological and technical conditions, to carry out work on perforation, testing and commissioning of wells. PC 7 Ability to analyze and interpret geological information: The ability to analyze geological data, the results of geophysical research, core material and other sources of information to optimize the drilling process.	

	PC 8 Ability to develop measures to prevent and eliminate drilling complications: The ability to identify the causes of drilling complications, develop and apply methods to eliminate and prevent them. PC 9 The ability to manage drilling processes and control their parameters: The ability to control drilling parameters (pressure, flow rate, drilling speed, etc.), to ensure the safety of work and the efficiency of the process. PC 10 The ability to ensure occupational safety and industrial safety during drilling operations: The ability to comply with the requirements of occupational safety and health, to develop measures to prevent accidents and emergency situations. PC 11 Ability to ensure environmental safety during drilling operations: The ability to assess the impact of drilling operations on the environment, develop and apply measures to minimize negative impacts and waste disposal. PC 12 Ability to innovate in the field of drilling: The ability to analyze and implement new methods, technologies, materials and equipment to improve the efficiency and safety of drilling operations.	
12	Learning outcomes of the educational programme: RO 1. Knows the economic, environmental, social, ethical and inclusive principles that underlie the formation of professional and cultural qualities of a specialist in the oil and gas industry RO 2. Carries out professional communication and business interaction in Kazakh, Russian and English languages when solving production problems in the field of drilling, demonstrating respect for social and ethical values for the development of intercultural dialogue RO 3. Demonstrates theoretical and practical knowledge in the field of physical, mathematical, natural sciences and information technology to ensure the implementation of the technological process of well drilling RO 4. Understands the philosophical and historical-cultural foundations of the development of society and their role in the formation of the civil and ideological position of a specialist in the field of oil and gas well drilling RO 5. Apply scientific methods to analyze technological problems, develop solutions and improve the safety of drilling processes, ensure the introduction of new drilling technologies and the implementation of innovative projects RO 6. Applies legal norms on subsoil use taking into account industrial safety requirements, environmental standards, control over the creation of safe conditions and principles of sustainable development in the conduct of drilling and entrepreneurial work RO 7. Apply innovative technologies and knowledge to solve technical problems of drilling oil and gas wells, ensures improved quality and safety of work taking into account economic, environmental and anti-corruption requirements RO 8. Organizes geological and field work, including planning the preparatory stage, well construction, maintaining and updating geological and statistical documentation in accordance with regulatory requirements RO 9. Ensures efficient and safe operation of modern drilling equipment, including preparation, setup and maintenance of drilling rigs, circulation and control systems, taking into account the requirements of an inclusive professional environment RO 10. Conducts analysis of mining and geological, geophysical and geochemical conditions of the work area, organization of geological and industrial work, maintenance of technical and geological documentation, drilling of wells in compliance with the requirements of industrial and technical safety sustainability RO 11. Uses modern software and information technologies to build geological models, analyze data and design well drilling, taking into account the tasks of digitalization and the introduction of innovations in the industry RO 12. Organizes research activities in the field of well drilling aimed at implementing innovative technologies, improving energy efficiency, and developing sustainable industrial infrastructure	
13	Form of training	full - time
14	Duration of training	4 years
15	Volume of loans	240
16	Languages of instruction	Russian/Kazakh
17	Academic degree awarded	
18	Developer(s) and authors:	

4.2. The relationship between the achievability of the formed learning outcomes according to the educational program and academic disciplines

№	Name of the discipline	Brief description of the discipline	Num ber of credit s	Generated learning outcomes (codes)											
				RO 1	RO 2	RO 3	RO 4	RO 5	RO 6	RO7	RO 8	RO 9	RO 10	RO 11	RO 12
Cycle of general education disciplines Compulsory component															
1	Foreign language	English is a compulsory subject. According to the results of placement test or IELTS score, students are placed into groups and disciplines. The name of the discipline corresponds to the level of English. When passing from level to level, prerequisites and postrequisites are respected.	10			+								+	+
2	Kazakh (Russian) language	The course covers the alphabet, sounds and letters, phonetic and intonational means of language, basic word-formation, morphological and syntactic units and the conditions of their use. Considers: listening, reading, writing and speaking. The course provides a lexical minimum, the assimilation of which is necessary for adequate communication in current communication situations. It is aimed at acquiring the skills of reading, writing and understanding spoken speech based on the simultaneous development of the basics of grammar and vocabulary in the course of constant repetition with a gradual complication of tasks.	10			+								+	+
3	Physical culture	The purpose of the discipline is to master the forms and methods of forming a healthy lifestyle within the framework of the professional education system. Familiarization with the natural-scientific basics of physical education, knowledge of modern health-improving technologies, basic methods of independent physical education and sports. As part of the course, the student will master the rules of judging in all sports.	8		+		+								
4	Information and communication technologies	Goal: Students will master the basics of information processes, modern technologies and data protection methods within the discipline of information and communication technologies.	5			+								+	+

		Contents: Study of text and spreadsheet editors, databases, introduction to the Python programming language. Additionally - the basics of network technologies, data transfer protocols, information security and setting up operating systems. Practical classes include labs on setting up network connections, working with databases, and developing programs in Python.													
5	History of kazakhstan	The purpose of the course of the history of Kazakhstan is to give objective historical knowledge about the main stages of the history of modern Kazakhstan; to focus students' attention on the problems of the formation and development of statehood and historical and cultural processes. The course tells about the history of Kazakhstan covering five main chronological periods, from the Stone Age to the present. During the study of the course, an opportunity is given to analyze the features and contradictions of the history of Kazakhstan in various periods, as well as the opportunity to reveal the historical content of the foundations of the laws of political, socio-economic, cultural processes from antiquity to the present stage. During the study of the course, great importance is given to the formation of an active civic position of students. The course is aimed at the humanization of technical education and is due to the huge role in strengthening the Kazakh identity, self-awareness of the people, the implementation of tasks related to the need for an intellectual breakthrough among the younger generation in the new millennium. Through an in-depth study of the history of Kazakhstan, the student learns to conduct an objective analysis of the development of the domestic historical process. At the same time, upon completion of the course, the student can use the acquired analytical knowledge and value orientations in everyday practice.	5	+	+	+									
6	Philosophy	The purpose of the discipline is to teach students the theoretical foundations of philosophy as a way of knowing and spiritually mastering the world;	5	+	+	+									

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

		developing their interest in fundamental knowledge, stimulating the need for philosophical assessments of historical events and facts of reality, assimilating the idea of the unity of the world historical and cultural process while recognizing the diversity of their skills in applying philosophical and general scientific methods in professional activities.													
7	Module of socio-political knowledge (sociology, politology)	The course is dedicated to the study of general political, sociological and psychological knowledge for bachelors of technical direction. Examines: political self-awareness, improving one's political outlook and communicative competences; basic sociological theories and the most effective ways to develop sociological imagination, understanding of the main concepts of sociology as a science	3	+	+	+	+								
8	Module of socio-political knowledge (culturology, psychology)	Cultural studies provides a basis for the study of the whole complex of social sciences and humanities, as well as a supplement to general courses in history and philosophy. The course includes questions: morphology, semiotics, anatomy of culture; culture of nomads of Kazakhstan, cultural heritage of proto-Türks, medieval culture of Central Asia, formation of Kazakh culture, Kazakh culture in the context of globalisation, cultural policy of Kazakhstan, etc. based on the application of psychology in practice, in various spheres of life: personal, family, professional, business, public, in work with people	5	+	+	+	+			+					
Cycle of general education disciplines															
Elective component															
9	Fundamentals of anti-corruption culture and law	Purpose: to increase the public and individual legal awareness and legal culture of students, as well as the formation of a knowledge system and a civic position on combating corruption as an antisocial phenomenon. Contents: improvement of socio-economic relations of the Kazakh society, psychological features of corrupt behavior, formation of an anti-corruption culture, legal responsibility for acts of corruption in various fields.	5	+						+					
10	Fundamentals of scientific research methods	Purpose: The goal of studying the discipline is to develop students' research skills; to introduce students to scientific knowledge, their readiness and				+		5					+		

		ability to conduct research. Objectives of studying the discipline: to contribute to the deepening and consolidation of existing theoretical knowledge by students; to develop practical skills in conducting scientific research, analyzing the results obtained and developing recommendations; to improve methodological skills in independent work with information sources and appropriate software and hardware; to master the principles of sustainable development and the implementation of ESG practices in Kazakhstan.												
11	Fundamentals of economics and entrepreneurship	Purpose: To develop basic knowledge of economic processes and skills in entrepreneurial activities. Content: The course aims to develop skills in analyzing economic concepts such as supply and demand, and market equilibrium. It includes the basics of creating and managing a business, developing business plans, risk assessment, and strategic decision-making.		+					+	+				
12	Ecology and life safety	Purpose: formation of ecological knowledge and consciousness, obtaining theoretical and practical knowledge on modern methods of rational use of natural resources and environmental protection. Contents: the study of the tasks of ecology as a science, the laws of the functioning of natural systems and aspects of environmental safety in working conditions, environmental monitoring and management in the field of its safety, ways to solve environmental problems; life safety in the technosphere, emergencies of a natural and man-made nature.		+					+			+		
13	Basics of Financial Literacy	Purpose: formation of financial literacy of students on the basis of building a direct link between the acquired knowledge and their practical application. Contents: using in practice all kinds of tools in the field of financial management, saving and increasing savings, competent budget planning, obtaining practical skills in calculating, paying taxes and correctly filling out tax reports, analyzing financial information, orienting in financial products to choose adequate investment strategies.		+					+	+				

Cycle of basic disciplines University component														
14	Mathematics I	Purpose: to introduce students to the fundamental concepts of linear algebra, analytical geometry and mathematical analysis. To form the ability to solve typical and applied problems of the discipline. Contents_ Elements of linear algebra, vector algebra and analytical geometry. Introduction to the analysis. Differential calculus of a function of one variable. The study of functions using derivatives. Functions of several variables. Partial derivatives. The extremum of a function of two variables.	5			+		+						
15	Physics	Purpose: To form ideas about the modern physical picture of the world and scientific worldview, the ability to use knowledge of fundamental laws, theories of classical and modern physics. Contents_ physical fundamentals of mechanics, fundamentals of molecular physics and thermodynamics, electricity and magnetism, vibrations and waves, optics and fundamentals of quantum physics.	5			+				+				
16	Mathematics II	Purpose: To teach students integration methods. To teach you how to choose the right method for finding the primitive. To teach how to apply a certain integral to solve practical problems. Contents_ integral calculus of the function of one and two variables, series theory. Indefinite integrals, methods of their calculation. Certain integrals and applications of certain integrals. Improper integrals. Theory of numerical and functional series, Taylor and Maclaurin series, application of series to approximate calculations_	5			+		+						
17	Engineering and computer graphics	Purpose: To develop students' knowledge of drawing construction and skills in developing graphical and textual design documentation in accordance with standards. Content: Students will study ESKD standards, graphic primitives, geometric constructions, methods and properties of orthogonal projection, Monge's projection, axonometric projections, metric tasks, types and features of connections, creating part sketches and assembly drawings, detailing, and creating complex 3D solid	5			+				+			+	

		objects in AutoCAD.													
18	General and structural geology	Purpose: to study the material composition of the Earth, geodynamic processes and forms of occurrence of rocks. Objectives: study of the material composition of the Earth, mineralogical, chemical; geodynamic exogenous and endogenous processes, forms of occurrence of igneous, sedimentary, metamorphic rocks, patterns of their location and consistency, geological conditions of formation, faults, general patterns of development of the earth's crust.	4						+		+				
19	Resistance of materials	Objective: to gain knowledge on the basic principles of mechanics of solids and the behavior of materials under the influence of loads, necessary for the design and analysis of drilling equipment Content: Concepts of forces, moments and equilibrium of systems. The behavior of materials under various loads, strength limits. Calculation of deformations and stress distribution in structures. Critical loads and methods of ensuring stability. Analysis of drilling equipment structures, calculation of its strength and reliability under operating conditions.	5			+						+			
20	Applied Mechanics	Objective: Formation of fundamental knowledge about the laws of mechanics for the analysis and design of drilling processes Contents: The article examines the basic laws of statics, kinematics and dynamics of solids and liquids, the basics of calculating the force interaction in a drill string, fluid flows in a well, stability and vibrations of drilling equipment with an emphasis on the tasks of drilling oil and gas wells.	5			+						+			
21	Drilling machines and mechanisms	Objective: to obtain knowledge about modern types of equipment, methods of their operation and repair for calculating the schemes of influence of parameters of auxiliary units during drilling operations Contents: Main types of drilling rigs, drive and lowering and lifting systems, pumping equipment, mechanisms for cleaning and circulation of drilling mud. Assessment of the technical condition of drilling equipment. Identification of problems in the performance of drilling equipment.	5					+				+			

		Development of a set of solutions to eliminate the identified problems and recommendations for their prevention													
22	Oil and gas well drilling technology and equipment	Objective: mastering modern methods and technologies for drilling oil and gas wells and modern digital technology for efficient drilling operations in various geological conditions Contents: Stages of the drilling process, design, operation and completion of drilling operations. Design of drilling operations. Drilling equipment and tools. The process of cementing and casing a well. Monitoring and control of the drilling process	6			+				+	+		+		
23	Basics of oil and gas well construction	Objective: mastering the basic principles, methods and technologies of oil and gas well construction for designing, organizing and conducting drilling operations Contents: Structure and types of wells: exploratory, production, injection and others. Stages of oil and gas well construction. Geological foundations of well construction. Design of well construction. Fundamentals of drilling and well construction technologies. Drilling equipment and tools. Control over the drilling process and well monitoring	5			+		+		+	+				
24	Fundamentals of development and operation of oil and gas fields	Objective: to master the methods of designing, developing and operating oil and gas fields using modern technologies to enhance oil recovery for analysis and regulation of development. Content: Methods of studying and modeling oil and gas reservoirs as objects of development. Technologies for extracting oil and gas from the subsurface. Creation of oil and gas field development systems. Comprehensive technical and economic methods of field development design. Methods of analysis and regulation of development	4					+	+		+				
25	Fluid mechanics in drilling	Objective: to form a knowledge base on the laws of equilibrium and fluid motion in order to acquire skills in calculating the main hydromechanical parameters for solving problems in the field of well drilling Contents: Rheological models of drilling fluids and their thixotropy. Effect of solid phase concentration, temperature and pressure on the rheological	5			+		+					+		

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

		properties of drilling fluids. Pressure on the walls and bottom of a well filled with viscoplastic or carbonated fluids. Sticking of the drill string due to hydrostatic pressure. Fluid flow regimes, hydromonitor effect of bit nozzles, removal of drill cuttings													
26	Training Practice	Purpose: to consolidate theoretical knowledge and acquire primary practical skills in the specialty "Drilling of oil and gas wells". Content: During the training practice, students get acquainted with the organization of drilling operations, study the design of the drilling rig, the purpose and principles of operation of the main and auxiliary equipment. The skills of reading technological diagrams, assembling and disassembling drilling tools, and determining the properties of drilling mud are being practiced. The practice is aimed at forming an idea of the technological process of drilling, the main professions of the drilling crew and safety regulations.	2	+	+	+	+	+	+	+	+	+	+	+	+
Cycle of basic disciplines Elective component															
27	Introduction to drilling	Objective: to develop basic knowledge about well drilling technology for subsequent study of professional disciplines. Contents: Well classification by purpose. Basic methods of well drilling. Drilling equipment and tools. Drilling process. Drilling muds and cement mixtures. Complications and accidents during drilling. Well drilling in various fields. Modern trends in drilling.	5		+	+	+						+		
28	Basic of petroleum engineering	The purpose of studying the discipline is the formation of basic knowledge about the oil and gas sector of the industry, the idea of the profession and preparation for the study of general technical disciplines. Tasks: introduction to the basic concepts and concepts of oil and gas engineering; acquaintance with the current state of the oil and gas industry in the world and Kazakhstan; with initial information about the search and exploration of deposits, drilling wells, designing pipeline structures and storage facilities.	5							+	+	+	+		

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

29	Geology of mineral deposits	Purpose: To form theoretical knowledge and practical skills for studying the geological conditions of the occurrence of mineral deposits, estimating reserves and mastering methods of prospecting and exploration of deposits to analyze the genesis of deposits, their classification and patterns of distribution. Contents: Patterns of formation and location of deposits, their classifications and structural features. Methods of prospecting and exploration of minerals, geological and economic assessment of deposits, modern development technologies. Mineral resource base, environmental aspects of subsurface use. The use of geological data for the rational development of natural resources	6		+				+		+				
30	Geology of oil and gas	Purpose: Formation of knowledge on geological features, conditions of education, prospecting, exploration and development of oil and gas fields based on modern technologies Contents: Origin, conditions of occurrence and history of combustible minerals. Rocks are reservoirs and tires, natural fluid reservoirs, traps, deposits, and oil and gas fields. Conditions of oil and gas formation and accumulation, migration, concentration and conservation of hydrocarbons in traps. Geological and geophysical methods of oil and gas exploration. Development of a scientific base for prospecting, exploration and development of oil and gas accumulations	5		+				+		+				
31	Rock destruction while drilling wells	Objective: Mastering the physical and mechanical properties of rocks, analyzing the processes of their destruction during drilling for the selection of modern drilling equipment Content: Methods for determining the physical and mechanical characteristics of rocks, analysis of the mechanisms of their destruction at the bottom of the well with various drilling methods. Designs of modern drill bits and crowns. Equipment and core sampling. Development of criteria for the selection of drilling tools, taking into account mining and geological conditions. Methods for predicting the performance of drilling tools and evaluating the effectiveness of their use	6			+			+		+		+		

32	General and petroleum geology	Objective: formation of basic knowledge about geological processes, the structure of the Earth and the features of the formation of oil and gas fields for the effective search, exploration and development of hydrocarbons Content: Fundamentals of general geology (Earth structure, geological processes, minerals, rocks, tectonics). Fundamentals of petroleum geology. Origin, migration, and accumulation of hydrocarbons. Formation of deposits. Methods of hydrocarbon exploration and prospecting. Geological conditions of oil and gas occurrence. Estimation of hydrocarbon reserves	6						+		+				
33	Geochemistry of organic matter and hydrocarbons of oil and gas basins	Objective: To develop knowledge about the properties, origin and transformation of organic matter, mechanisms of formation and migration of hydrocarbons in sedimentary basins Contents: Organic substances of rocks. Methods of geochemical analysis, Process of oil and gas formation. Processes of oil and gas generation. Concept of oil and gas source formations. Stages of oil formation, composition and products of oil and gas. Composition, concentration and degree of transformation of hydrocarbons. Fundamentals of quantitative and qualitative assessment of geological resources of hydrocarbons by methods of organic geochemistry and mathematical modeling	5			+		+		+					
34	Hydrogeochemistry	Objective: Acquisition of knowledge about the chemical composition of groundwater, the processes of its formation for the assessment, management and sustainable use of resources Contents: Properties and composition of water, mass transfer in hydrogeochemical systems. Formation of groundwater composition. Hydrogeochemical zoning, geochemistry of fresh, medicinal and industrial mineral waters. Migration of elements, features of the processes of formation of water composition in various geological conditions. Groundwater of humid and arid regions. Formation waters of terrigenous, carbonate and sulfate deposits. Hydrogeochemical zoning	5			+		+			+				

35	Metrology, standardization and certification	Objective: To develop students' knowledge of measurement methods, standards and certification procedures that ensure quality and safety during drilling Contents: Fundamentals of metrology, unity of measurements, errors. Standards and regulations, national and international standardization systems. Methods of product and process certification, ensuring compliance of technological operations with the requirements of regulatory and technical documentation in the field of drilling oil and gas wells	5						+			+		+	
36	Geoecological Monitoring	Purpose: gaining knowledge of the methods and technologies used to observe, analyze and assess the state of the natural environment and ecosystems Contents: Concept of monitoring, meaning, types, functions, goals and objectives of GM. Methods for assessing the state of the environment. Equipment and technology of geoecological monitoring. Instruments and methods for monitoring environmental quality. Identification of zones of geoecological crisis. A set of environmental monitoring methods. Methods of geophysical, geochemical, biological, agrochemical, landscape research	5	+					+	+					
37	Digital modelling of drilling processes	Objective: To develop students' competencies in the field of 3D modeling of drilling processes and equipment, including the creation of virtual models, their visualization and application for engineering calculations and scientific research using modern CAD systems. Contents: Study of 3D design methods using KOMPAS-3D as an example, the basics of computer modeling, digital technologies for designing drilling equipment and optimizing technological processes.	4			+		+		+				+	
38	Energy saving in drilling technologies	Objective: formation of comprehensive knowledge on the principles and methods of energy conservation in the processes of drilling oil and gas wells Contents: Relevance of the problem of energy saving in the oil and gas industry. Analysis of energy consumption in drilling processes. Energy-saving technologies in mechanical drilling and in the circulation system. Energy saving in power supply of drilling rigs. Energy saving in heat supply of drilling rigs. Energy	4								+	+			

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

		audit and energy management at drilling enterprises. Regulatory framework in the field of energy saving.													
39	3D computer modelling in drilling	Objective: to develop knowledge of 3D computer modeling methods for designing, analyzing and optimizing drilling processes based on developing skills in working with modern modeling software Contents: Basic concepts and principles of 3D modeling. Overview of popular software solutions (Petrel, Schlumberger, AutoCAD, etc.). Basics of working with modeling tools. Building geological models. Modeling drilling trajectories and well designs. Using 3D models to predict and prevent complications. Optimization of drilling parameters based on modeling. Methods for visualizing modeling results. Interpretation of data for decision making	4			+		+						+	
40	Legal legal framework for subsoil use	Objective: Formation of knowledge on legal norms and legislative acts for regulation of relations in the field of subsoil use and compliance with legislation in exploration, extraction and protection of minerals Contents: Legislation in subsoil use, international agreements, rights and obligations of the state and subsoil users. Licensing, taxation and environmental requirements. Dispute resolution mechanisms, liability for violations and comparative analysis of the legislation of different countries. Lawful and effective use of subsoil	6	+			+		+						
41	Drilling supervision	Objective: To develop students' skills in conducting technical examination of drilling plans, equipment, materials and technological processes in the oil and gas industry. Content: Study of the regulatory framework for well drilling, preparation and control of the drilling process, casing and testing of wells. Consideration of industrial safety, quality control of drilling operations, personnel and resource management, document flow and reporting, interaction with contractors, problem analysis and decision-making	6		+			+	+						+
Cycle of specialised disciplines University component															
46	Hydraulic machines and	Purpose: to form knowledge on the design and	5			+					+	+			

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

	compressors	operating principles of various types of hydraulic machines, compressors, and their use in the oil and gas industry. Contents: General information about hydraulic machines and compressors. Fundamentals of hydrostatics and hydrodynamics. Hydraulic pumps and hydraulic turbines. Principles of operation and classification of compressors. Reciprocating and screw compressors. Hydraulic machines and compressors in the oil and gas industry. Current trends and innovations in the field of hydraulic machines and compressors												
47	Drilling of deviated, horizontal and multilateral wells	Objective: Development of knowledge and skills in the field of drilling inclined, horizontal and multilateral wells, including trajectory design, selection of drilling equipment and fluids for effective management of the drilling process, taking into account geological conditions. Content: Study of the principles of designing inclined and horizontal wells, drilling technologies such as rotary and turbine drilling, and the use of telemetry systems. Consideration of specialized equipment, including stabilizers, deflecting slips, downhole motors and measurement systems on the drill string	5			+				+		+		+
48	Prevention and elimination of accidents and complications	Objective: To develop skills in identifying, preventing and eliminating emergency situations and complications arising during drilling and operation of oil and gas wells in order to ensure the safety and efficiency of technological processes. Content: Study of the classification of accidents and complications during drilling and operation of wells, including analysis of causes and consequences. Consideration of accident prevention systems, methods of eliminating emergency situations, as well as safety precautions during emergency rescue operations	6						+	+		+	+	
49	Geosteering in drilling	Objective: To develop knowledge of geosteering and telemetry systems, as well as technical means of controlling the wellbore profile when drilling inclined and horizontal wells. Content: The course covers the basics of telemetry during drilling, directional drilling technologies, errors and uncertainties when drilling horizontal wells, related	5			+		+		+		+		

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

		to both geology and limitations of telemetry tools. Methods for calculating the well trajectory, modern geosteering methods, modeling various geosteering scenarios before drilling for risk management purposes													
Cycle of specialised disciplines Elective component															
50	Corrosion protection of oil and gas equipment	Objective: Gaining in-depth knowledge of corrosion, anti-corrosion protection of equipment during oil and gas production operations Contents: Basic concepts and definitions of corrosion processes. Chemical corrosion of metals. Electrochemical corrosion of metals. Corrosive surveys. Insulation coating metal structures. Cathodic protection of underground metal structures. Protector protection of pipelines and tanks. Electro drainage protection of underground pipelines. Inhibitor corrosion.	5							+		+			
51	Industrial safety and environmental protection	Objective: Formation of knowledge and skills in the field of industrial safety of oil and gas production to prevent accidents, ensure safe working conditions and protect the environment at hazardous production facilities Content: Study of the fundamentals of industrial safety, legal regulation, safety management systems, risk assessment and management methods, as well as technologies and equipment that ensure safety at oil and gas enterprises. Particular attention is paid to the development and implementation of measures to prevent accidents and eliminate their consequences	5	+			+		+	+			+		
52	Rational use of natural resources	Objective: to form a comprehensive understanding of the principles of rational use of natural resources, environmental responsibility and sustainable development Contents: The concept of natural resources and their classification. Main types of natural resources. Patterns of formation, distribution and use of natural resources. Environmental problems associated with the use of natural resources. Methods of rational use of natural resources. Rational use of natural resources in various industries. Innovations in the field of rational use of natural resources.	5	+					+		+				
53	Design of deepwater	Objective: To develop a comprehensive	5			+			+			+		+	

	drilling equipment	understanding of the design, engineering and calculation features of deepwater drilling equipment and tools Contents: Features and challenges of deepwater drilling. Deepwater drilling rigs. Risers. Subsea blowout preventers (BOP). Subsea manifolds. Deepwater drill bits. Control and monitoring systems for deepwater drilling equipment. Materials for deepwater drilling equipment. Current trends in the design of deepwater drilling equipment												
54	Pre-degree/ Pre-project analysis	Objective: Development of students' skills in the justified choice of the topic of the diploma work (or project), taking into account the relevance of the problem, scientific novelty and practical significance, as well as preparation for the effective defense of the results of the pre-diploma (or pre-project) analysis Content: The course includes an analysis of current problems in the chosen subject area, formulation of research goals and objectives, review of existing solutions, justification of research (design) methods, formation of the structure of the thesis (or project), presentation of the results of pre-graduation (or pre-project) analysis and preparation for the defense of these results.	6					+		+	+			+
55	Modern instrumental methods of research	Objective: Students will acquire theoretical foundations and practical skills in using modern instrumental research methods to solve scientific and applied problems in various fields of science and technology. Content: Physicochemical and geophysical methods for studying rocks and drilling fluids. Instruments and equipment for monitoring drilling parameters. Logging methods, non-destructive testing. Spectral, X-ray and electronic methods of analysis. Interpretation of data and application of digital technologies and automated systems in conducting research during well drilling	6					+		+	+			+
56	Drilling and grouting fluids	Objective: To form an understanding of the importance of drilling and grouting solutions in the construction and operation of oil and gas wells to eliminate the impact on drilling efficiency, sealing and durability of wells. Contents: Drilling and grouting fluids, their functions in the process of	5						+	+			+	

		drilling and fixing wells. Classification of drilling fluids Composition and properties of drilling fluids. Monitoring and correction of solution parameters. Drilling complications caused by drilling fluids, causes and ways to prevent them. Technology of preparation of solutions													
57	Foreign market of well drilling equipment and technology	Objective: Formation of knowledge about the foreign market of well drilling equipment and technologies for the analysis of modern trends, innovative solutions and application of advanced methods in the oil and gas industry Content: Advanced drilling technologies. Intelligent drilling tools, rotary steerable systems and controlled pressure drilling. Introducing digitalization and data analytics into drilling processes. Trends in automation, robotics and sustainability. Environmentally friendly drilling fluids and innovations in directional drilling	5							+		+		+	
58	Well logging	Purpose: increasing the level of professional knowledge, skills and abilities of students in the field of field geophysical surveys of wells as a method of borehole observations and their use in a complex of geological and geophysical work Contents: Fundamental principles of rock physics, types of logging tools, openhole analysis, determination of permeability, reservoir evaluation without shale and shale sand formations, determination of water saturation, Archie equation, reservoir pay, oil and gas saturation, recoverable reserves, drilling fluid logging principles , acoustic logs, neutron logs, resistivity and density logs, and lithological plots..	5				+			+		+			
59	Design and operation of pump and compressor stations	Purpose: to teach future specialists in the design and operation of pumping and compressor stations Content: introduces the development of technological schemes for the installation of structures of buildings of compressor stations, pumping stations, as well as main and auxiliary technological equipment, engineering networks and technological pipelines, ensuring their safe operation and reliability over the standard service life and during construction and reconstruction.	5				+			+		+			

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

60	Well completion	Purpose: to acquire knowledge on the physical basis of geophysical methods and their practical application in obtaining coreless documentation of oil and gas wells Content: Distribution of physical fields of different nature. Classification of GIS methods, range of solved geological and technical problems. Hardware-methodical complex GIS. Logging and method of logging. Methods of work, basic interpretation of GIS data in an open trunk. Operations in wells. Development control, GIS methods in a closed barrel	5			+				+		+	+		
61	Materials science for drilling equipment	Objective: to develop a comprehensive understanding of the properties, characteristics and application features of various materials used in the manufacture of drilling equipment and tools Contents: Classification of materials used in drilling equipment. Metallic, polymer, composite, ceramic materials. Physical and mechanical properties of materials. Corrosion and wear of materials. Methods of testing and quality control of materials. Selection of materials for drilling equipment	5			+				+		+			
62	Quality management in drilling	Objective: To develop students' skills in managing the quality of drilling operations, assessing and controlling work quality in accordance with safety and performance standards. Content: Principles and methods of quality management in well drilling; quality standards and regulatory documents. Quality management systems (ISO, API); monitoring of technological processes and performance indicators. Analysis of nonconformities and risks; audit and certification methods. Tools for improving efficiency and reliability of drilling operations. Application of digital technologies in quality assurance.	5					+	+	+				+	
63	Reservoir geomechanics	Objective: To develop students' ability to analyze, synthesize and design elements of a production system to assess the impact of drilling on the distribution of stresses in a productive formation Contents: Basic concepts of formation geomechanics. Calculation of formation and geostatic pressures. Destruction of rocks under compression, tension and shear. Calculations for determining horizontal	5			+				+				+	

НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»

		stresses, the angle of internal friction and the coefficient of friction													
64	Fundamentals of Artificial Intelligence	Purpose: to familiarize students with the basic concepts, methods and technologies in the field of artificial intelligence: machine learning, computer vision, natural language processing, etc. Contents: general definition of artificial intelligence, intelligent agents, information retrieval and state space exploration, logical agents, architecture of artificial intelligence systems, expert systems, observational learning, statistical learning methods, probabilistic processing of linguistic information, semantic models, natural language processing systems.	5	+	+			+		+				+	
65	Advanced Thermodynamics and Phase Behavior of Reservoir Fluids	Purpose: is an in-depth study of thermodynamic principles and their application in technological processes of oil and gas production. Contents: the discipline covers the laws of thermodynamics in technological processes of oil and gas production. Thermophysical properties of sedimentary rocks. Thermophysical properties of formation fluids of natural origin. Components of formation fluids. Students will gain the knowledge necessary to analyze and optimize hydrocarbon production processes.	4			+		+					+		
66	Tamponage materials	Objective: Acquiring knowledge about optimal cementing materials for different geological conditions for the purpose of selection, organization of well cementing works, ensuring isolation of formations and longevity of wells Contents: Materials used for plugging (isolation) of wells. Types of plugging materials (cements, polymers, gels). Composition and properties of plugging solutions. Technologies for preparation and injection of plugging mixtures. Quality control and testing of materials. Modern developments and environmental aspects	4						+	+			+		
67	Well design	Objective: To develop students' practical skills in calculating and reasonably selecting well designs, as well as selecting equipment for drilling and operation in various geological and technical conditions Content: The types of wells are studied (exploratory,				+		+		+			+		

		production, injection, geothermal, etc.), the influence of geological features on the well design is analyzed. The stages of designing the structure, the choice of drilling fluids and equipment, methods for increasing the reliability of wells, as well as modern technologies and innovative approaches to design are considered													
68	Engineering and Sustainable Drilling	Objective: To develop knowledge and skills in designing and conducting drilling operations taking into account the principles of sustainable development, environmental protection and industrial safety. Content: Environmentally friendly drilling technologies, waste disposal, well life cycle assessment, selection of optimal technical solutions with minimal impact on nature, compliance with ESG standards and state environmental requirements are considered		+				+	+				+		
69	Well control	Objective: to master the theoretical foundations and practical skills of monitoring, managing and preventing complications during drilling and well operation. Content: study of physical and chemical processes in a well, drilling mud parameters, operation of blowout prevention equipment, as well as automatic monitoring systems and sensors used to improve the safety and reliability of operations						+		+			+		
70	Well drilling in difficult conditions	Objective: to develop an understanding of the main types of complications, their causes and methods of combating them in the process of drilling wells to develop a scientific approach to solving problems associated with drilling in complicated mining, geological and man-made conditions. Contents: Well drilling technologies. Causes of complications, methods of preventing and eliminating accidents. Features of drilling in unstable rocks, at high pressures, temperatures and in absorption zones. Modern technical means and technologies for risk management.			+	+		+		+			+		
71	Industrial internship I	Purpose: to acquire practical skills of participation in production processes for drilling wells and mastering the profession of a worker on a drilling rig. Content: During the first industrial internship,	2	+	+	+	+	+	+	+	+	+	+	+	+

		students consolidate the knowledge gained in educational practice and apply it in the conditions of an operating enterprise. The technological stages of drilling, preparation of drilling equipment, lowering and lifting of tools, preparation of drilling mud, and control of drilling mode parameters are studied. Students participate in process supervision, maintain technological documentation, and become familiar with the requirements of industrial and environmental safety.													
72	Industrial internship II	Purpose: to consolidate professional competencies and prepare for the final qualification work. Content: During the second internship, students perform the functions of an assistant drilling foreman, participate in the organization and control of drilling operations, analyze technical and economic indicators. The drilling process is being monitored, technological reports are being prepared, and the causes of possible complications and ways to prevent them are being analyzed. The practice ends with the preparation of a report containing conclusions and suggestions for improving drilling technology and improving work efficiency.	3	+	+	+	+	+	+	+	+	+	+	+	+

5. CURRICULUM

NON-PROFIT JOINT STOCK COMPANY
“KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY NAMED AFTER K.I. SATBAYEV”



«APPROVED»
Decision of the Academic Council
NPJSC «KazNRTU»
named after K.Satbayev»
dated 18.06.2025 Minutes № 17

WORKING CURRICULUM

Academic year
Group of educational programs
Educational program
The awarded academic degree
Form and duration of study

2025-2026 (Autumn, Spring)
B071 - "Mining and mineral extraction"
6B07222 - "Drilling of oil and gas wells"
Bachelor of engineering and technology
full time - 4 years

Discipline code	Name of disciplines	Block	Cycle	Total ECTS credits	Total hours	lek/lab/pr Contact hours	in hours SIS (including TSIS)	Form of control	Allocation of face-to-face training based on courses and semesters								Prerequisites	
									1 course		2 course		3 course		4 course			
									1 sem	2 sem	3 sem	4 sem	5 sem	6 sem	7 sem	8 sem		
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)																		
M-1. Module of language training																		
LNG108	Foreign language		GED, RC	5	150	0/0/45	105	E	5									
LNG104	Kazakh (russian) language		GED, RC	5	150	0/0/45	105	E	5									
LNG108	Foreign language		GED, RC	5	150	0/0/45	105	E		5								
LNG104	Kazakh (russian) language		GED, RC	5	150	0/0/45	105	E		5								
M-2. Module of physical training																		
KFK101	Physical culture I		GED, RC	2	60	0/0/30	30	E	2									
KFK102	Physical culture II		GED, RC	2	60	0/0/30	30	E		2								
KFK103	Physical culture III		GED, RC	2	60	0/0/30	30	E			2							
KFK104	Physical culture IV		GED, RC	2	60	0/0/30	30	E				2						
M-3. Module of information technology																		
CSE677	In formation and communication technology		GED, RC	5	150	30/15/0	105	E			5							
M-4. Module of socio-cultural development																		
HUM101	History of kazakh stan		GED, RC	5	150	15/0/30	105	E		5								
HUM134	Module of socio-political knowledge (cultural studies, psychology)		GED, RC	5	150	30/0/15	105	E			5							
HUM132	Philosophy		GED, RC	5	150	15/0/30	105	E				5						
HUM120	Module of socio-political knowledge (sociology, political science)		GED, RC	3	90	15/0/15	60	E				3						
M-5. Module of anti-corruption culture, ecology and life safety base																		
CHE656	Ecology and life safety	1	GED, CCH	5	150	30/0/15	105	E				5						
MNG489	Fundamentals of economics and entrepreneurship	1	GED, CCH	5	150	30/0/15	105	E				5						
PET519	Fundamentals of scientific research methods	1	GED, CCH	5	150	30/0/15	105	E				5						
HUM136	Fundamentals of anti-corruption culture and law	1	GED, CCH	5	150	30/0/15	105	E				5						
MNG564	Basics of Financial Literacy	1	GED, CCH	5	150	30/0/15	105	E				5						
CYCLE OF BASIC DISCIPLINES (BD)																		
M-6. Module of physical and mathematical training																		
MAT101	Mathematics I		BD, UC	5	150	15/0/30	105	E	5									
PHY468	Physics		BD, UC	5	150	15/15/15	105	E	5									

**НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»**

MAT102	Mathematics II		BD, UC	5	150	15/030	105	E	5								MAT101
M-7. Module of basic training																	
GEN429	Engineering and computer graphics		BD, UC	5	150	15/030	105	E	5								
GPH499	Introduction to drilling	1	BD, CCH	5	150	30/015	105	E	5								
PET520	Basic of petroleum engineering	1	BD, CCH	5	150	30/015	105	E	5								
GEO198	General and structural geology		BD, UC	4	120	30/15/0	75	E		4							
AAP173	Practical training		BD, UC	2				R		2							
GEN468	Applied Mechanics		BD, UC	5	150	30/015	105	E		5							
GIN159	Geology of oil and gas	1	BD, CCH	5	150	30/15/0	105	E		5							
GEO699	Geology of mineral deposits	1	BD, CCH	5	150	30/15/0	105	E		5							
GPH523	Rock destruction while drilling wells	2	BD, CCH	6	180	30/030	120	E		6							
GPH524	General and petroleum geology	2	BD, CCH	6	180	30/030	120	E		6							
GPH525	Basics of Oil and Gas Well Construction		BD, UC	5	150	30/015	105	E		5							
GEN467	Resistance of materials		BD, UC	5	150	30/015	105	E		5							
GIN160	Geochemistry of organic matter and hydrocarbons of oil and gas basins	1	BD, CCH	5	150	30/015	105	E		5							
GIN161	Hydrogeochemistry	1	BD, CCH	5	150	30/015	105	E		5							
CSB31	Fundamentals of Artificial Intelligence	1	BD, CCH	5	150	15/030	105	E		5							
GPH527	Drilling and grouting fluids		BD, UC	5	150	30/015	105	E		5							
GPH528	Hydraulic machines and compressors		BD, UC	5	150	30/015	105	E		5							
PET528	Fundamentals of development and operation of oil and gas fields		BD, UC	4	120	30/15/0	75	E		4							
GPH526	Oil and gas well drilling technology and equipment		BD, UC	5	150	30/015	105	E		5							
PET527	Reservoir geomechanics	1	BD, CCH	5	150	30/015	105	E		5							
GPH505	Digital modelling of drilling processes	1	BD, CCH	5	150	30/015	105	E		5							
GPH529	Metrology, standardization and certification	2	BD, CCH	5	150	30/015	105	E		5							
GPH460	Geocological Monitoring	2	BD, CCH	5	150	30/15/0	105	E		5							
PET529	Fluid mechanics in drilling		BD, UC	5	150	30/015	105	E		5							
GPH530	Tamponage materials	1	BD, CCH	4	120	30/015	75	E		4							
GPH506	Energy saving in drilling technologies	1	BD, CCH	4	120	30/015	75	E		4							
GPH507	3D computer modelling in drilling	2	BD, CCH	4	120	30/015	75	E		4							
PET274	Advanced Thermodynamics and Phase Behavior of Reservoir Fluids	2	BD, CCH	4	120	30/015	75	E		4							
GPH531	Drilling machines and mechanisms	1	BD, CCH	6	180	30/030	120	E		6							
GPH502	Legal legal framework for subsoil use	1	BD, CCH	6	180	30/030	120	E		6							
CYCLE OF PROFILE DISCIPLINES (PD)																	
M-8. Module of professional activity																	
AAP102	Production practice I		PD, UC	2				R		2							
AAP183	Production practice II		PD, UC	3				R		3							
PET530	Geosteering in drilling		PD, UC	5	150	30/15/0	105	E		5							
PET531	Corrosion protection of oil and gas equipment	1	PD, CCH	5	150	30/015	105	E		5							
GPH535	Industrial safety and environmental protection	1	PD, CCH	5	150	30/015	105	E		5							
GPH102	Well logging	2	PD, CCH	5	150	30/15/0	105	E		5							
GPH511	Rational use of natural resources	2	PD, CCH	5	150	30/015	105	E		5							
GPH532	Well design		PD, UC	5	150	30/015	105	E		5							
GPH533	Drilling of inclined, horizontal and multilateral wells		PD, UC	5	150	30/015	105	E		5							

**НАО «КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
имени К.И. САТПАЕВА»**

GPH534	Prevention and elimination of accidents and complications		PD, UC	6	180	30/0/30	120	E								6		
GPH513	Pre-diploma/Pre-project analysis	1	PD, CCH	6	180	30/0/30	120	E								6		
GPH514	Modern instrumental methods of research	1	PD, CCH	6	180	30/0/30	120	E								6		
GPH536	Engineering and Sustainable Drilling	2	PD, CCH	5	150	30/0/15	105	E								5		
PET532	Well drilling in difficult conditions	2	PD, CCH	5	150	30/15/0	105	E								5		
PET533	Foreign market of well drilling equipment and technology	1	PD, CCH	5	150	30/0/15	105	E								5		
GPH537	Well control	1	PD, CCH	5	150	30/0/15	105	E								5		
GPH538	Drilling Supervision	2	PD, CCH	5	150	30/0/15	105	E								5		
PET534	Design and operation of pump and compressor stations	2	PD, CCH	5	150	15/0/30	105	E								5		
PET535	Well completion	3	PD, CCH	5	150	30/0/15	105	E								5		
GPH521	Materials science for drilling equipment	3	PD, CCH	5	150	30/0/15	105	E								5		
GPH519	Design of deepwater drilling equipment	4	PD, CCH	4	120	30/0/15	75	E								4		
PET536	Quality management in drilling	4	PD, CCH	4	120	30/15/0	75	E								4		
M-9. Module of final attestation																		
ECA103	Final examination		FA	8												8		
Additional type of training (ATT)																		
AAP500	Military training																	
Total based on UNIVERSITY:										32	28	28	32	29	31	33	27	
										60	60	60	60					

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
		Required component (RC)	University component (UC)	Component of choice (CCH)	Total
GED	Cycle of general education disciplines	51	0	5	56
BD	Cycle of basic disciplines	0	65	45	110
PD	Cycle of profile disciplines	0	26	40	66
Total for theoretical training:		51	91	90	232
FA	Final attestation				8
TOTAL:					240

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 7 dated 10.06.2025

Decision of the Academic Council of the Institute. Minutes № 8 dated 30.04.2025

Signed:

Governing Board member - Vice-Rector for Academic Affairs

Uskenbayeva R. K.

Approved:

Vice Provost on academic development

Kalpeyeva Z. B.

Head of Department - Department of Educational Program Management and Academic-Methodological Work

Zhumagaliyeva A. S.

Director - Geology and Oil-gas Business Institute named after K. Turyssov

Auyelkhan Y. .

Department Chair - Geophysics and seismology

Ratov B. T.

Representative of the Academic Committee from Employers

Khitrov D. M.

____Acknowledged____

