NCJS «KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY
named after K.I.SATBAYEV»

Institute of Geology and Oil and Gas Business named after K.Turyssov

Department of Petroleum Engineering

EDUCATIONAL PROGRAM

7M07202 «Petroleum Engineering»

Code and classification of the field of education: 7M07 «Engineering, manufacturing and construction industries»
Code and classification of training areas: 7M072 «Industrial and manufacturing branches»
Group of educational programs: M115 «Oil Engineering»
Level on NQF: 7
Level on SQF: 7
Period of study: 2
Volume of the credits: 120

Almaty 2025

Educational program 7M07202 «Petroleum Engineering» approved at the meeting of the Academic Council of KazNRTU named after K.Satbayev.

Protocol no. 10 from 2025 y. "03" 06.

Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after K.Satbayev.

Protocol no. 3 from 2024 y. "20" 12.

Educational program 7M07202 «Petroleum Engineering» eveloped by the academic committee in the direction of 7M072 «Manufacturing and pricessing»

Full name	Academic degree/ academic title	Position, course	Place of work, contact.	Note
Chairperson of Academic Committee:				
Dias Abdimaulen	PhD	Head of the Department	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Teaching staff:				
Gulnaz Moldabayeva	Doctor of Technical Sciences, prof.	Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Zaurbekov Seitzhan	Candidate of Technical Sciences	Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Akhymbayeva Bibinur	PhD	Associate Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Baimukhametov Murat	Candidate of Physical and Mathematical Sciences, docent	Associate Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Moldabekov Murat	PhD	Associate Professor	NCJS «Kazakh National Research	

			Technical University named after K.I.Satbayev»	
Smashov Nurlan	Candidate of Technical Sciences, docent	Associate Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Imansakipova Nurgul	PhD	Associate Professor	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Yskak Ardak	PhD	Senior Lecturer	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	
Employers:				
Nurkas Zhasulan		Director	LLP «Manul»	
Bekbau Bakbergen	PhD	Leading Researcher, Modeling Service	«KMG Engineering» LLP	
Nysangaliyev Amangali	Doctor of Technical Sciences, Professor, Academician of the National Engineering Academy of the Republic of Kazakhstan	Director of the Center for Ground Design	JSC «Kazakh Institute of Oil and Gas»	
Students:				
Ibrayeva Korlan	Doctoral student in the educational program 8D07202 – "Petroleum Engineering"	2nd year	NCJS «Kazakh National Research Technical University named after K.I.Satbayev»	

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1. Description of the educational program

The educational program 7M07202 «Petroleum Engineering» is aimed at training masters who are able to independently solve a wide range of engineering tasks in the field of the oil and gas industry and conduct scientific and pedagogical activities.

The educational program is designed to train specialists in the field of development and operation of oil and gas fields, well drilling, transportation and storage of hydrocarbons.

The curriculum of the 7M07202 «Petroleum Engineering» educational program has been developed taking into account the curricula of the master's degree program of famous research and engineering universities of the world, such as Colorado Schools of Mines, University of Lorraine. The curriculum is fully consistent with current trends in the development of science and technology used in the modern oil and gas industry. The OP is based on the state educational standard for higher professional education; on the professional standard. Atlas of new professions - analytical engineer in the oil and gas industry. The professional standard for this educational program:

1)Operation of oil and gas wells

2) Professional standard: Teacher (faculty) of higher and (or) postgraduate education organizations

3) Oil and gas production management

Undergraduates practice in such companies as «Kazmunaygas» JSC, «KMG Engineering» LLP, «QazaqGaz» NC JSC, «Volkovgeologiya» JSC, «SNPS - Ai Dan Munai» JSC, «Kazakh Institute of Oil and Gas» JSC. Under the academic mobility program, undergraduates have the opportunity to complete internships at leading engineering universities in the world.

At all levels of training, teaching is conducted by highly qualified teaching staff, including graduates of universities around the world and the Bolashak program.

Graduates can choose a different career path. They can start working directly as practicing engineers in industry, or they can continue their doctoral studies in petroleum engineering.

The Master's degree program «Petroleum Engineering» is the second level of qualification of the three-level higher education system, it lays the foundation for doctoral programs. The educational program 7M07202 «Petroleum Engineering» was reviewed at a meeting of the Educational and Methodological Council of KazNRTU named after K.I. Satbayev and approved at a meeting of the Academic Council of KazNRTU named after K.I. Satbayev.

2.The purpose and objectives of the educational program

Purpose of the EP: Training of highly qualified specialists in the oil and gas industry with modern scientific, pedagogical and entrepreneurial skills and

competencies, capable of professionally solving problems at all stages of project implementation in the oil and gas sector. The program focuses on the introduction of innovative and sustainable technologies that take into account the environmental, social and economic aspects of the industry, in accordance with the International Sustainable Development Goals (SDGs).

Objectives of the EP:

1. To train specialists who will be able to apply knowledge of mathematics, science and technology, as well as identify, formulate and solve engineering problems to improve the technological processes of the oil and gas industry.
2. To instill in undergraduates knowledge of research methodology (setting research goals, collecting data, processing and transforming data, examining data, building models and selecting methods, presenting and visualizing results)
3. Develop the ability to extract the necessary information from various sources, including information flows in real time, analyze it for further decision-making and see logical connections in the system of collected information.
4. To train undergraduates to effectively communicate information and thoughts to other people.
5. To instill in undergraduates the desire for independent learning and the manifestation of a high level of competence in engineering principles and practice.
6. To teach undergraduates the skills of working in different industry and multicultural teams.
7. To develop the graduates' need to live and practice ethical, social and environmental standards in their professions in a responsible manner.

3. Requirements for the evaluation of learning outcomes of the educational program

The educational program has been developed in accordance with the State Mandatory Standards of Higher and Postgraduate Education, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 (registered in the Register of State Registration of Regulatory Legal Acts under No. 28916) and reflects the learning outcomes on the basis of which curricula are developed (working curricula, individual students' curricula) and work study programs in disciplines (syllabuses).

Assessment of learning outcomes is carried out according to the developed test tasks within the framework of the educational program in accordance with the requirements of the state mandatory standard of higher and postgraduate education.

When assessing learning outcomes, uniform conditions and equal opportunities are created for students to demonstrate their knowledge, skills and abilities.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	Code and classification of the field of education:	7M07 «Engineering, manufacturing and construction industries»
2	Code and classification of training areas:	7M072 «Industrial and manufacturing branches»
3	Group of educational programs:	M115 «Oil Engineering»
4	Name of the educational program	7M07202 «Petroleum Engineering»
5	Brief description of the educational program	The educational program "Petroleum Engineering" is devoted to the formation of a knowledge base on the methodology of building concepts, strategies, functional models of activity and interaction, ways of setting and systematically solving tasks and problems in monitoring and managing natural and man-made systems during extraction from the subsoil and transportation of hydrocarbons (oil, associated and natural gas) and other components. It instills management skills, which involves the creation of a strategy for the functioning and development of structures in the oil and gas industry. The subjects of professional activity of the OP are deposits and enterprises engaged in the development and operation of oil and gas fields.
6	Purpose of the EP	Training of highly qualified specialists in the oil and gas industry with modern scientific, pedagogical and entrepreneurial skills and competencies, capable of professionally solving problems at all stages of project implementation in the oil and gas sector. The program focuses on the introduction of innovative and sustainable technologies that take into account the environmental, social and economic aspects of the industry, in accordance with the International Sustainable Development Goals (SDGs).
7	EP type	New EP
8	Level on NQF	7
9	Level on SQF	7
10	Distinctive features of the EP	no
11	List of competencies of the educational program:	1.Apply modern knowledge of geology and exploration of MPI in your professional and academic career, design exploration work and provide guidance 2.Apply appropriate analysis methods, both qualitative and quantitative, collect and integrate information in the best way and according to the standards of the geological and mining industry. 3. Demonstrate the skills of teaching in the bachelor's degree program, working with students, and leading them.

		4. Conduct independent original research that contributes to the development of geological science and the industry, according to the best practices and standards of the industry. 5. Have communication skills, speak both written and oral language in Russian, Kazakh and foreign languages, professionally and ethically. 6. Have professional knowledge in the field of geological disciplines that contribute to the formation of a highly educated person with a broad outlook and culture; be able to combine theory and practice to solve geological problems
12	Learning outcomes of the educational program:	1. conduct independent research based on their own skills and abilities to obtain scientific results that contribute to the development of the oil and gas industry 2. have a developed ability to conduct professional written and oral communication with all stakeholders in the oil and gas industry 3. demonstrate a steady desire for continuous improvement of their professional knowledge and self-development 4. apply knowledge of oil and gas engineering and skills of critical analysis, evaluation and synthesis of new ideas in professional activities 5. have the ability to demonstrate high professional qualities and ethics while performing production and/or scientific tasks of the oil and gas industry 6. apply qualitative and quantitative methods of analysis, collect, integrate and interpret data according to oil and gas industry standards 7. be able to develop and implement innovative technologies for the extraction and processing of hydrocarbons, taking into account the principles of sustainable development
13	Form of training	Full-time
14	Period of study	2
15	Volume of the credits	120
16	Language of education	Kazakh, Russian, English
17	Degree to be conferred	Master of Technical Sciences
18	Developer and author:	PhD, Associate Professor Imansakipova Nurgul

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	Number of credits	PO1	PO 2	PO3	PO4	PO5	PO6	PO7
Cycle of general education disciplines Required component										
Cycle of basic disciplines University component										
1	Foreign language (professional)	The course is aimed at studying the main problems of scientific knowledge in the context of its historical development and philosophical understanding, the evolution of scientific theories, principles and methods of scientific research in the historical construction of scientific paintings of the world. The discipline will help to master the skills of developing critical and constructive scientific thinking based on research on the history and philosophy of science. At the end of the course, undergraduates will learn to analyze the ideological and methodological problems of science and engineering and technical activities in building Kazakhstan's science and the prospects for its development.	3		v	v				
2	History and philosophy of science	Purpose: to explore the history and philosophy of science as a system of concepts of global and Kazakh science.	3		v	v				

		Content: the subject of philosophy of science, dynamics of science, the main stages of the historical development of science, features of classical science, non-classical and post-non-classical science, philosophy of mathematics, physics, engineering and technology, specifics of engineering sciences, ethics of science, social and moral responsibility of a scientist and engineer.								
3	Higher school pedagogy	The course is aimed at mastering the methodological and theoretical foundations of higher education pedagogy. The discipline will help to master the skills of modern pedagogical technologies, technologies of pedagogical design, organization and control in higher education, skills of communicative competence. At the end of the course, undergraduates learn how to organize and conduct various forms of organizing training, apply active teaching methods, and select the content of training sessions. Organize the educational process on the basis of credit technology of education.	3		**v**	**v**		**v**		
4	Psychology of management	The course is aimed at mastering the tools for effective employee management, based on knowledge of the psychological mechanisms of the	3		**v**	**v**		**v**		

		manager's activity. Discipline will help you master the skills of making decisions, creating a favorable psychological climate, motivating employees, setting goals, building a team and communicating with employees. At the end of the course, undergraduates will learn how to resolve managerial conflicts, create their own image, analyze situations in the field of managerial activity, as well as negotiate, be stress-resistant and effective leaders.								
5	Pedagogical practice	Application in the educational process of modern scientific knowledge of the discipline, the use of innovative technologies in the organization of the educational process. Creating the conditions to achieve professional competence in accordance with the requirements of the standard in the direction of training. Preparation for teaching activities in the mining, metallurgical and oil and gas production. Creation of scientific and pedagogical educational programs related to modern tasks of mining, metallurgical and oil and gas production, for use in scientific and scientific and technical universities and educational institute	8		v	v		v		
Cycle of basic disciplines										

Component of choice										
1	Intellectual property and research	The purpose of this course is to provide undergraduates with the knowledge and skills necessary to understand, protect and manage intellectual property (IP) in the context of scientific research and innovation. The course is aimed at training specialists who can effectively work with IP, protect the results of scientific research and apply them in practice.	5		v	v		v		
2	Enhanced oil recovery	Purpose: to form a holistic view of the principles and technology of enhanced oil recovery, the main criteria determining the effectiveness of the technological process of enhanced oil recovery and their relationship. Content: the discipline covers the development and production of oil and gas fields, taking into account the limitations of their complexity, methods of increasing oil recovery, basic physical and mathematical patterns and factors describing the influence of external influences on the field.	5	v			v			v
3	Principles of designing oil and gas storages	Objective: To master the principles of designing oil and gas storage facilities, methods and concepts of visual representation of spatial data obtained as a result of measurements for making	5					v	v	v

		managerial and engineering decisions. Content: as a result of studying the subject, the undergraduate must master - underground and surface reservoirs; the foundation and foundation of reservoirs, the classification of oil depots, the main structures of oil depots, gas storage facilities, features of storage of liquefied petroleum gases								
4	Principles of Reservoir engineering	Purpose: To study the basic principles underlying the development of oil and gas fields, the application of the material balance method in the development of these fields, we will study various modes of deposit development for their application in the material balance equation. The concept of water inflow into the reservoir will also be considered. We will perform calculations to predict oil and gas production from fields, as well as to predict reservoir pressure and production from oil and gas wells. Content: This course covers the key concepts required for the development of oil and gas fields. We will study methods for calculating initial hydrocarbon reserves, as well as analyze changes in pressure and	5				v		v	

		temperature in deposits depending on depth. Let's consider the natural processes of oil displacement, as well as draw a material balance for saturated and unsaturated oils. In addition, we will study the parameters of wells based on hydrodynamic studies, determine the PVT properties of reservoir fluids and rocks, analyze the results of oil field development, perform calculations of water inflow into the reservoir and forecast oil production during water injection and other aspects.								
5	Principles of drilling technology	Purpose: to study the basic principles, methods and technologies used in drilling oil, gas and other types of wells. Content: students master the theoretical foundations and practical skills necessary for planning, conducting and controlling well drilling, taking into account geological, engineering-geological, technological and economic aspects. The main goal is to provide students with the knowledge and skills necessary for the effective drilling of wells in compliance with safety requirements, environmental protection and optimization of the hydrocarbon production process.	5				v		v	
6	Principles of production engineering	Purpose: To teach undergraduates the principles of well construction	5				v		v	v

		technology, the principles of downhole oil production, scientific understanding of fundamental technological processes and work in oil production. Contents: Principles of opening productive facilities, principles of calling the inflow and development of wells, principles of impact on the productive reservoir, principles of impact on the bottom–hole zone of the well, principles of well operation, principles of calculating the operating modes of the borehole-formation system.								
7	Advanced Petrophysics	Purpose: in-depth study of the physical and chemical properties of rocks and their fluid-saturated parts to solve complex problems related to exploration, production and management of oil and gas fields. Content: development of skills in interpreting data from geophysical surveys of wells, analysis of porosity, permeability and saturation of rocks, as well as assessment of their reservoir properties. The main objective of the discipline is to train specialists who are able to effectively use petrophysical methods for the search and development of oil and gas fields.	5	v				v		

8	Advanced Reservoir Engineering	Purpose: In-depth study of the properties of reservoir fluids, relative permeability, the effect of plantar water on oil and gas production, practical application of methods for maintaining reservoir pressure, methods for increasing oil recovery, as well as other techniques for optimizing reservoir operation. Content: The course involves a set of basic calculations to determine the reserves of gas and oil in the reservoir, the study of the history of production to predict the flow rates of oil, gas and water. Modeling of various field development options.	5	v				v		
9	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	5	v			v			
10	Advanced Production Engineering	Purpose: Techniques and technologies for well construction in complicated conditions, techniques and technologies for oil production in complicated	5	v			v			v

		conditions, scientific understanding of technological processes and operations during oil production in complicated conditions. Contents: Modern technologies for opening productive facilities in complicated conditions, modern technologies for calling the inflow and development of wells, modern technologies for influencing the productive reservoir, modern technologies for influencing the bottom–hole zone of the well, well automation, automation of the operating modes of the borehole-formation system.								
11	Sustainable development strategies	Purpose: To train graduate students in sustainable development strategies to achieve a balance between economic growth, social responsibility, and environmental protection. Content: Graduate students will study the concepts and principles of sustainable development, the development and implementation of sustainable development strategies, the evaluation of their effectiveness, and international standards and best practices. Cases and examples of successful sustainable development strategies are included.	5		v	v		v		

Cycle of profile disciplines **University component**										
1	Geosteering in drilling	Purpose: The study of the theoretical foundations, navigation and telemetry systems, as well as technical means of controlling the profile of the wellbore when drilling inclined and horizontal wells. Contents: The course covers the fundamentals of telemetry, measurement and logging while drilling and directional drilling technologies, criteria for selecting the minimum required logging dataset before performing geosteering, errors and uncertainties when drilling horizontal wells associated with both geology and limitations of telemetry and logging tools, as well as methods for calculating the well trajectory, modern methods of geosteering, basics of interpretation of azimuthal logs, modeling of various geosteering scenarios before drilling commences in order to manage risks, geosteering in real time on-the-job.	5	**v**					**v**	
2	Research seminar for petroleum graduates	Purpose: formation of the scientific base in research, analysis and formation of results, including literary research, planning and publication of scientific research. Content: the discipline defines the general methodology of scientific research, as well as methods of obtaining theoretical, experimental and	5	**v**	**v**	**v**				

		experimental works in the oil and gas industry.								
3	Methods to improve the efficiency of oil and gas pipelines	Purpose: To form knowledge and practical skills in the field of operation of gas and oil pipelines to solve scientific and technical problems of their safe operation. Content: as a result of studying the subject, the undergraduate must master theoretical and practical skills in improving the efficiency of gas and oil pipelines, the main issues of pipeline transport of liquid and gaseous hydrocarbons are considered, the essence of technological processes related to pumping oil and gas through main pipelines is given	5	v					v	v
4	Petroleum Reservoir Simulation: Black -oil model	The purpose of the discipline "Reservoir Modeling: Black-oil model" is to teach students the basics and methods of numerical modeling of oil and gas reservoirs using a simplified Black-oil model. The course is aimed at developing students nts skills in using mathematical and computer technologies to analyze and predict the behavior of the reservoir during field development. Students study the fundamental physical and chemical processes that occur in the reservoir, and also master modeling techniques that optimize the production and management of oil and gas reservoirs. Content: The Reservoir Modeling: Black-oil Model course covers the	5					v	v	

		fundamentals of using the Black-oil model to model the behavior of oil and gas reservoirs. Students learn: Fundamentals of the Black-oil model, including the physical and chemical properties of oil, gas and water. Mathematical description of reservoir processes, such as flow and mass conservation equations for each phase. Application of numerical methods to solve model equations, including finite difference and volume methods. Analysis of modeling results to optimize field development and production management.								
5	Basic Coding for Petroleum Engineering	The purpose of the discipline is to develop in students the fundamental skills and knowledge in the field of programming necessary to solve engineering problems in the oil and gas industry. The discipline is designed to teach methods of software development, data analysis and automation of engineering calculations, which allows to increase the efficiency and quality of engineering research and design work in the oil and gas industry. The course is aimed at acquiring competencies in the use of modern software tools and programming languages relevant for petroleum engineers. Contents: The discipline covers the study of the basic principles and techniques of programming necessary to solve specific problems in the oil and gas industry.	5				v	v		

		Students learn programming languages suitable for data analysis, process modeling, and calculation automation, such as Python or MATLAB. The course includes topics on algorithm development, data structures, basics of working with databases and interfaces. Particular attention is paid to applications that help in geological data analysis, production management and process optimization in the oil and gas industry.							
6	Theory of motion of gas-liquid mixtures	Purpose: the study of the distinctive features of gas-liquid mixtures, structures and forms of movement of gas-liquid mixtures, criteria for the allocation of structures and forms of gas-liquid flows, energy balance in the well. Contents: investigation of the constrained movement of gas bubbles in a stationary liquid; structures, forms of movement of gas-liquid mixtures and criteria for their separation; the physical essence of the liquid lifting process; equation of motion of the mixture in long lifts. Methods are considered that allow analyzing, synthesizing and designing the operation of ideal and semi-ideal lifts; the operation of the lift in various modes, as well as calculating costs.	5	**v**					**v**	
7	Research practice	The research practice of the undergraduate is conducted in order to familiarize himself with the latest theoretical, methodological and technological achievements of domestic and foreign science, modern methods of scientific research, processing	8		**v**	**v**		**v**		

		and interpretation of experimental data.								
Cycle of profile disciplines Component of choice										
1	Design of pumping and compressor stations	Purpose: To form knowledge and practical skills in the field of optimizing the operation of pumping and compressor stations to solve scientific and technical problems for their safe operation. Content: as a result of studying the subject, the undergraduate must master theoretical and practical skills in determining the main technical indicators of pumping and compressor units, regulating the operation of pumping and compressor units in different situations, taking into account their characteristics, management and operation of basic and auxiliary equipment.	5				**v**	**v**	**v**	
2	Basic Statistics for Petroleum Engineers	Purpose: after completing the course, the undergraduate must demonstrate the ability to analyze, synthesize and design the operation of lifts; the operation of the lift in various modes, as well as calculate costs. Contents: - assessment for the method of operation; - estimation of particular x-parameters; - generalized Z-parameters for various well operation methods; - field calculation of the cost of oil production.	5		**v**		**v**		**v**	
3	Research seminar for petroleum graduates	Purpose: To study and analyze modern methods of intensification of reservoir fluid	5	**v**				**v**		

		inflow. Analysis and generalization of data on specific deposits. consideration of the dependence of intensification on production indicators. Contents: To analyze the advantages and disadvantages of various methods of increasing oil recovery, methods of intensification of inflow as a means of obtaining profitable oil and gas flows in low-permeability reservoirs.								
4	Advanced Rock Mechanics	Purpose: Mastering the disciplinary knowledge of physical properties and processes in rocks, patterns of formation and changes in properties, principles of their use, when solving problems in the construction of wells. Contents: This module expands on existing knowledge in the field of rock mechanics, in particular with regard to the systematic design of excavation work and support systems in rock formations. It examines the strength and stress variability of rock mass at different scales and describes methods that engineers can use for long term planning and risk mitigation during drilling, production and reservoir engineering.	5		**v**				**v**	
5	Project Management	Goal: Gaining knowledge about the components and methods of project management based on modern models and standards. Objectives: study of behavioral models of project-oriented management of business development; mastering international standards PMI PMBOK, IPMA ICB and national standards of the Republic of Kazakhstan in the field of	5				**v**		**v**	

		project management; analysis of the features of organizational management of business development through the integration of strategic, project and operational management.								
6	Well construction and workover supervising	Purpose: in-depth study of well construction and reconstruction technology, well construction quality management, drilling supervision theory, formation of practical drilling supervision skills; improving knowledge and skills in the field of economics, organization and management of drilling production; economic and mining law; technical regulation of geophysical and geological-technological research in drilling. Contents: Study by subject: Drill bits and their development, Well fastening technology and casing cementing, Well construction and well completion technology, Geological and technological research in the drilling process, Well trajectory management, Well flushing and flushing fluids, Technological risk in drilling, Offshore drilling, Drilling rigs and equipment, Geophysical methods of well research in the process of drilling wells, Drilling supervision, Technical and economic indicators of the drilling company's activity, Mining law and subsoil use law, Well Construction Quality Management, Well construction process Safety, Computer technologies in drilling, Well construction design, New well	5		v	v		v		

		construction techniques and technologies								

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

SATBAYEV UNIVERSITY

«APPROVED»
Decision of the Academic Council
NPJSC«KazNRTU
named after K.Satbayev»
dated 06.03.2025 Minutes № 10

WORKING CURRICULUM

Academic year	**2025-2026 (Autumn, Spring)**
Group of educational programs	**M115 - "Oil engineering"**
Educational program	**7M07202 - "Petroleum Engineering"**
The awarded academic degree	**Master of Technical Sciences**
Form and duration of study	**full time (scientific and pedagogical track) - 2 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		
									1 sem	2 sem	3 sem	4 sem	
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)													
CYCLE OF BASIC DISCIPLINES (BD)													
M-1. Module of basic training (university component)													
LNG213	Foreign language (professional)		BD, UC	3	90	0/0/30	60	E	3				
HUM214	Psychology of management		BD, UC	3	90	15/0/15	60	E	3				
HUM212	History and philosophy of science		BD, UC	3	90	15/0/15	60	E		3			
HUM213	Higher school pedagogy		BD, UC	3	90	15/0/15	60	E		3			
M-2. Petroleum Engineering Basic Training Module													
PET228	Advanced Petrophysics	1	BD, CCH	5	150	30/0/15	105	E	5				
PET230	Advanced Thermodynamics and Phase Behavior of Reservoir Fluids	1	BD, CCH	5	150	30/0/15	105	E	5				
MNG781	Intellectual property and research	1	BD, CCH	5	150	30/0/15	105	E	5				
PET247	Principles of designing oil and gas storages	2	BD, CCH	5	150	30/0/15	105	E	5				
PET226	Principles of Reservoir engineering	2	BD, CCH	5	150	30/0/15	105	E	5				
PET267	Principles of production engineering	2	BD, CCH	5	150	30/0/15	105	E	5				
PET246	Principles of drilling technology	2	BD, CCH	5	150	30/0/15	105	E	5				
PET229	Advanced Reservoir Engineering	1	BD, CCH	5	150	30/0/15	105	E		5			
PET232	Advanced Production Engineering	1	BD, CCH	5	150	30/0/15	105	E		5			
PET213	Enhanced oil recovery	1	BD, CCH	5	150	30/0/15	105	E		5			
MNG782	Sustainable development strategies	1	BD, CCH	5	150	30/0/15	105	E		5			
M-4. Practice-oriented module													
AAP273	Pedagogical practice		BD, UC	8				R			8		
CYCLE OF PROFILE DISCIPLINES (PD)													
M-3. Petroleum Engineering Professional Activity Module													
PET266	Theory of motion of gas-liquid mixtures		PD, UC	5	150	30/0/15	105	E	5				
PET263	Research seminar for petroleum graduates		PD, UC	5	150	15/0/30	105	E	5				
PET268	Basic Coding for Petroleum Engineering		PD, UC	5	150	30/0/15	105	E		5			
PET265	Methods to improve the efficiency of oil and gas pipelines		PD, UC	5	150	30/0/15	105	E		5			

PET269	Well construction and workover supervising	1	PD, CCH	5	150	30/0/15	105	E		5			
PET260	Advanced Rock Mechanics	1	PD, CCH	5	150	30/0/15	105	E		5			
PET240	Geosteering in drilling		PD, UC	5	150	30/15/0	105	E			5		
PET216	Petroleum Reservoir Simulation: Black -oil model		PD, UC	5	150	30/0/15	105	E			5		
PET264	Research seminar for petroleum graduates	1	PD, CCH	5	150	30/0/15	105	E			5		
PET261	Basic Statistics for Petroleum Engineers	1	PD, CCH	5	150	30/0/15	105	E			5		
PET224	Design of pumping and compressor stations	2	PD, CCH	5	150	30/15/0	105	E			5		
MNG705	Project Management	2	PD, CCH	5	150	30/0/15	105	E			5		
M-4. Practice-oriented module													
AAP269	Research practice		PD, UC	8				R				8	
M-5. Experimental research module													
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R	4				
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R		4			
AAP251	Research work of a master's student, including internship and completion of a master's thesis		RWMS	2				R			2		
AAP255	Research work of a master's student, including internship and completion of a master's thesis		RWMS	14				R				14	
M-6. Module of final attestation													
ECA212	Registration and protection of the master thesis		FA	8								8	
Total based on UNIVERSITY:									30	30	30	30	
									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	0	0	0	0
BD	Cycle of basic disciplines	0	20	15	35
PD	Cycle of profile disciplines	0	38	15	53
Total for theoretical training:		**0**	**58**	**30**	**88**
RWMS	Research Work of Master's Student				24
ERWMS	Experimental Research Work of Master's Student				0
FA	Final attestation				8
TOTAL:					**120**

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 3 dated 20.12.2024

Decision of the Academic Council of the Institute. Minutes № 3 dated 28.11.2024

Signed:

Governing Board member - Vice-Rector for Academic Affairs — Uskenbayeva R. K.

Approved:

Vice Provost on academic development — Kalpeyeva Z. Б.

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 - Petroleum Engineering — Akhymbayeva B. .

Representative of the Academic Committee from Employers ____Acknowledged____ — Nysangaliev A.