



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

EDUCATIONAL PROGRAM
6B08601 " Water resources and water use "
code and name of the educational program

Code and classification of the field of education: 6B08 Agriculture and bioresources.

Code and classification of training areas: 6B08601-Water resources and water use

Group of educational programs: B082 – Water resources and water use.

NQF level: 6

ORK level: 6

Duration of study: 4

Volume credits: 240

Almaty, 2025

Educational program 6B08601 "Water Resources and Water Use"
approved at the meeting of the Academic Council of KazNITU named after K.I. Satpayev .

Protocol No. 10 of "06" 03_2025

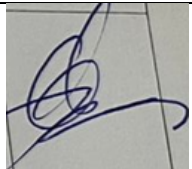
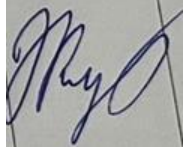
Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of KazNITU named after K.I. Satpayev .

Protocol No. 3 of "20" 12_2025

Educational program 6B08601 "Water Resources and Water Use"

code and name of the educational program

developed by the academic committee for the field of "Water Resources and Water Use"

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List of abbreviations and designations

BD – basic disciplines
GOSO – state compulsory education standard
DP – documented procedure
DOT – distance educational technologies
UNT – Unified National Testing
IEP – individual educational plan
KTO – credit-based learning technology
KED – catalog of elective courses
MES RK – Ministry of Education and Science of the Republic of Kazakhstan
MOP – modular educational program
R&D – scientific research work
R&D and ID - scientific research work and innovation activities
NIRS – students' scientific research work
OOD – general education disciplines
OP – educational program
PD – major disciplines
PC – personal computer
PPS – professorial and teaching staff
RK – Republic of Kazakhstan
RUP – working curriculum
QMS – quality management system
SRD – independent work of students
SRDP – independent work of students under the guidance of a teacher
ТҮПІІ – standard curriculum
UVP – educational and support personnel
UMKD – educational and methodological complex of disciplines
UMS – educational and methodological council
UMR – educational and methodological work
EUM – electronic educational materials

1. Description of the educational program

The educational program (hereinafter, EP) is a set of documents developed by the Kazakh National Research Technical University named after K.I. Satpayev and approved by the Ministry of Education and Science of the Republic of Kazakhstan. Bachelor's degree training in educational program 6B08601-Water Resources and Water Use is carried out with the assignment of the qualification - Bachelor of Agriculture. The duration of study for full-time is 4 years, for distance (correspondence) learning (after higher education) - 3 years. The main characteristics and trends of the training areas for specialists in the training area 6B08601-Water Resources and Water Use correspond to the Classifier of training areas for personnel with higher and postgraduate education of the Republic of Kazakhstan.

The OP takes into account the needs of the regional labor market, the requirements of government agencies and relevant industry requirements and is based on the state educational standard for higher professional education in the relevant field.

The educational program defines the program's educational objectives, student learning outcomes, the necessary conditions, content, and technologies for implementing the educational process, as well as the assessment and analysis of student performance during and after completion. The educational program includes the curriculum, course content, learning outcomes, and other materials to ensure high-quality student education.

OP 6B08601 "Water Resources and Water Management" aims to assist students, faculty, and industry experts in understanding the structure of the educational process and demonstrating how the curriculum and course content contribute to the development of essential core competencies upon completion of the program. Last but not least, the OP aims to establish a common basis for the feasibility and necessity of the "Water Resources and Water Management" training program for all stakeholders, including government, public authorities, the water industry, universities, parents and students, and the community. It is designed to provide specialized training for bachelor's degree students in the "Water Resources and Water Management" program at Satbayev University. University and was developed within the framework of the 6B08 Agriculture and Bioresources direction.

This document meets the requirements of the following legislative acts of the Republic of Kazakhstan and regulatory documents of the Ministry of Education and Science of the Republic of Kazakhstan:

- The Law of the Republic of Kazakhstan "On Education" with amendments and additions within the framework of legislative changes to increase the independence and autonomy of universities dated 04.07.18 No. 171-VI.
- Law of the Republic of Kazakhstan "On Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on Issues of Expanding the Academic and Managerial Independence of Higher Education Institutions" dated 04.07.18 No. 171-VI.
- Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 "On approval of the Model Rules for the activities of educational organizations of the corresponding types."
- State Compulsory Standard of Higher Education (Appendix 7 to the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 10/31/18 No. 604.

- Resolution of the Government of the Republic of Kazakhstan dated 19.01.12 No. 111 "On approval of the Model Rules for Admission to Educational Organizations Implementing Higher Education Programs" with amendments and additions dated 14.07.16 No. 405.
- Resolution of the Government of the Republic of Kazakhstan dated 13.08.12 No. 1042 "On approval of the Concept for the development of the geological industry until 2030".
- The Law on Subsoil and Subsoil Use and the draft Code on Subsoil and Subsoil Use.
- Code of public reporting of exploration results, mineral resources and reserves of KAZRC.
- Concept of the State Program for Geological Exploration for 2021–2025, January 31, 2020
- "National Qualifications Framework", approved by the protocol of March 16, 2016, of the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.

2. The purpose and objectives of the educational program

of the educational program "Water Resources and Water Use" is to train highly qualified, competitive specialists in the field of water resource management and use , including groundwater resources, as well as in the design and operation of water management systems and structures. The program culminates in the award of a Bachelor of Agriculture degree.

The goal of the OP 6B08601 - "Water Resources and Water Use" is to prepare qualified bachelors capable of solving problems in the field of water resources management and focused on solving professional issues of rational use, distribution and management of water resources based on fundamental knowledge in accordance with the requirements of state and international standards.

Sphere of professional activity :

Natural objects in the form of geographical components of geosystems of various levels: surface and underground waters, air masses of the troposphere, natural-technological complexes, anthropogenic landscapes, settlements, energy, health, recreational, historical, cultural and scientific facilities.

2.1 Objects of professional activity :

The objects of professional activity of graduates are

- water management and hydropower systems, complexes, enterprises ;
- hydraulic structures for various purposes : spillways, water outlets, water intakes, hydroelectric power stations, pumping stations, fish protection structures;
- reclaimed lands;
- scientific research , design and engineering organizations.

2.2 Subjects of professional activity

- dams, reservoirs ;
- hydraulic engineering and hydropower structures;
- irrigation and drainage network;
- estuary systems ;
- rivers, lakes , groundwater.

2.3 Types of professional activity

Bachelor's degree in specialty 6B08601 - "Water Resources and Water Use" can perform the following types of professional activities:

- design and engineering;
- production and technological;
- organizational and managerial;
- scientific research.

2.4 Functions of professional activity

- organize and manage the work of design, water management, hydropower, agricultural, municipal organizations and enterprises;
- carry out research work in educational institutions and research centers in water, agriculture and energy management;
- carry out examination, supervision and control over the use of water resources, audit and monitoring of water management facilities, etc.

2.5 Typical tasks of professional activity

A bachelor's degree in Water Resources and Water Use, depending on the type of professional activity, is prepared to solve the following professional problems:

a) design and engineering:

- carries out work on the creation of projects for modern, highly efficient, technically advanced water management engineering systems using an analysis of the effectiveness of the implemented engineering option in comparison with other options provided for in the design documentation;
- carries out work on designing measures for the protection and improvement of natural waters and wastewater treatment;
- participates in the development of “Schemes for the integrated use and protection of water resources”, basin agreements on the use and protection of water resources;
- carries out ecological and economic assessment of river basins, water management facilities and industries (certification of water bodies, ecological certification of water management industries).
- carries out work on the design and implementation of projects to restore the natural state of rivers and reservoirs;
- carries out expert assessments of projects affecting water and water management facilities;
- conducts environmental and economic assessments of water management projects.

b) production and technological:

- carries out work on the implementation of projects for the creation of modern, highly efficient, technically advanced engineering water management and hydropower systems, systems for the collection, supply and distribution of water for water supply and wastewater disposal;
- carries out work on the implementation of environmental improvement projects in watersheds;
- carries out work on the implementation of projects for the protection and improvement of natural waters and wastewater treatment;
- participates in conducting research to determine the initial data necessary for the design of water use and wastewater disposal facilities;

- conducts an analysis of natural conditions to determine the possibility of satisfying human economic and recreational needs for water resources in conditions of uncertainty and variability of the properties of the aquatic environment;
- participates in assessing the state of water resources and facilities, water management systems;
- carries out work on monitoring and compiling a cadastre of water bodies and resources.

c) organizational and managerial:

- carries out work on information services, organization of production, labor and management, metrological support, technical control in the field of water use;
- develops methodological and regulatory documents, technical documentation, as well as proposals and activities for the implementation of developed projects and programs in the field of water use, ensuring the trouble-free and efficient operation of all structures and elements in accordance with their purpose and design parameters;
- participates in the implementation of work on the standardization of technical means, systems, processes, equipment and materials, in the review of technical documentation and the preparation of necessary reviews, feedback, and conclusions on issues of the work being performed;
- facilitates the provision of water supply enterprises with the necessary technical data, documents, materials, and equipment;
- participates in the development of regulations and provisions on the use and protection of water bodies and resources; carries out expert assessments of projects that affect them;
- participates in the verification of compliance with water legislation and rules for the protection of water resources, exercises control over the restoration of damaged natural waters, participates in the regulation of relations between water users, and the maintenance of the state water cadastre ;
- inspects the work of water management, water protection, enterprises and organizations;
- prepares work schedules, orders, applications, instructions, explanatory notes, maps, diagrams, other technical documentation, as well as established reporting in accordance with approved forms and within specified timeframes ;
- provides methodological and practical assistance in the implementation of projects and programs, plans and agreements;
- carries out examination of technical documentation, supervision and control over the condition and operation of equipment;
- monitors compliance with established requirements, current norms, rules and standards.

d) research:

- participates in research into processes arising during water use, the implementation of measures to protect water bodies, and the prevention and elimination of the consequences of their pollution as a result of anthropogenic activities;
- studies and analyzes the results of work on water use, summarizes and systematizes them in order to predict expected changes in the hydrogeological and hydrological regimes of waters.

Tasks of the OP:

- study of a cycle of *general educational disciplines* to ensure social and humanitarian education based on the laws of social and economic development of society, history, modern information technologies, the state language, foreign and Russian languages;
- study of a cycle of *basic disciplines* to ensure knowledge of natural science, general technical and economic disciplines, as the foundation of professional education;
- the cycle of *specialized disciplines* is focused on the study of disciplines that form knowledge, skills and abilities in planning and organizing research, designing water management works;
- familiarization with technologies and equipment of enterprises during various types of internships.
- acquisition of theoretical knowledge and practical skills in solving hydraulic and hydrotechnical problems related to the design, construction and operation of hydraulic structures;
- students will acquire deep theoretical knowledge in the field of hydraulic and hydrotechnical calculations, designs and composition of hydraulic structures of water management complexes, and use this knowledge in the design, construction and operation of water management facilities for hydropower, land reclamation, water supply and other purposes.

3. Requirements for the assessment of educational learning outcomes programs

Results development OOP b bakalavra are determined acquired graduate competencies And his ability apply formed general cultural, general professional And professional competencies V in accordance With tasks of professional activity.

IN result development OOP graduate must have next competencies:

A) general cultural (OK):

- ability use basics philosophical knowledge For formations ideological positions (OK-1);
- the ability to analyze the main stages and patterns of historical development society For formation of civil positions (OK-2);
- the ability to use the basics of economic knowledge in various spheres life activity (OK-3);
- ability use basics legal knowledge V various spheres vital activity (OK-4);
- ability to communicate orally and in writing Russian and foreign languages For solutions tasks interpersonal And intercultural interactions (OK-5);
- ability work V team, tolerantly perceiving social, ethnic, confessional And cultural differences (OK-6);
- ability To self-organization And self-education (OK-7);
- ability use methods And means physical cultures For provision full-fledged social And professional activities (OK-8);

- the ability to use first aid techniques, methods of protection in conditions emergency situations (OK-9);

- b) general professional competencies (OPK):

- ability to be aware social significance his own future professions, possession high motivation To execution professional activities (OPK-1);

- possession performances O modern scientific painting peace on basis knowledge of the fundamental principles of philosophy, basic laws and methods of natural sciences (OPK-2);

- the ability to use basic knowledge in professional activities mathematicians and natural sciences (OPK-3);

- ability decide standard tasks professional activities on on the basis of information and bibliographic culture with the use of information communication technologies And With taking into account main requirements informational security (OPK-4);

- the ability to use industry-specific regulatory and legal documents in his own professional activities (OPK-5).

- V) professional competencies (PC):

- IN areas research activities:

- Independently understand and apply appropriate methods of analysis, collect and integrate information in the best possible way according to the standards of the geological, hydrogeological and geoecological industry, the ability use knowledge V areas geology, geophysics, geochemistry, hydrogeology And engineering geology, geoecology, ecological hydrogeology For solutions research tasks related their use in construction and organization of water supply from groundwater (PC-1);

- Defend your own point of view on a professional problem, argue original ideas when solving problems of monitoring, forecasting and managing risks associated with ecology, the ability on one's own receive geological, hydrogeological, engineering and geological information, use V research activities skills field And laboratory hydrogeological, engineering geological And environmental research (PC-2);

- Demonstrate a high level of skills in setting strategic hydrogeology objectives, project management and defending conclusions and results as intellectual property on a global scale, the ability V composition research team participate V interpretations geological, hydrogeological, engineering and geological information, compilation reports, abstracts, bibliographies By topic scientific research, V preparation of publications (PC-3);

- IN areas scientific and industrial activities:

- Able to demonstrate high professional qualities and ethics when interacting with various stakeholders. Readiness to apply basic general professional knowledge in practice and skills field geological, geophysical, geochemical, hydrogeological, oil and gas And ecological and geological works at decision production tasks related With provision construction And operation buildings And structures, organizations

and operation of systems water supply (PK-4);

- Demonstrate scientific writing skills, high professional qualities and research ethics in scientific communication in the state, Russian and foreign languages with various stakeholders, readiness to work in modern field and laboratory geological, geophysical, geochemical, hydrogeological, engineering-geological instruments, installations and equipment (PC-5);

- Demonstrate knowledge of modern scientific research methods and the ability to apply them in carrying out scientific projects and research in the field of environmental protection V composition scientific and production team participate V drawing up maps, diagrams, sections, and other established reports on approved forms (PC-6).

Correspondence required competencies And composite parts OOP given V matrix and a competency map .

4. Passport of the educational program

4.1. General information

No.	Field name	Note
1	Code and classification of the field of education	6 B08 Agriculture and bioresources
2	Code and classification of training areas	6B08 601 Water resources and water use
3	Group of educational programs	B082 Water resources and water use
4	Name of the educational program	Water resources and water use
5	Brief description of the educational program	Water resources and water use is a science that studies the origins of modern water management policy. The objectives are the basic methods and principles of the integrated use of water resources, their current state and the most complete and economically feasible satisfaction of the needs of water users and consumers, taking into account the preservation of nature and the protection of water from pollution and depletion.
6	The purpose of the OP	The goal of the "Water Resources and Water Use" educational program is to train highly qualified, competitive specialists in water resource management and use, including groundwater resources, as well as in the design and operation of water management systems and structures. The program culminates in a Bachelor of Agriculture degree. To prepare qualified bachelors capable of solving problems in the field of water resources management and focused on solving professional issues of rational use, distribution, and management of water resources based on fundamental knowledge in accordance with the requirements of national and international standards.
7	Type of OP	production and technological; organizational and managerial; experimental research : calculation, design and analytical
8	Level according to the National Qualification Test	6
9	Level according to the ORK	6
10	Distinctive features of the OP	The most important feature of the object of research on the environmental principles of nature conservation and rational use of natural resources, the prospects for the creation of non-destructive technologies, the latest discoveries in natural science, the prospects for their use in the construction of technical devices, the methodology of environmental justification of engineering projects, methods of designing and calculating hydraulic and hydroelectric structures, the principles of the layout of hydraulic structures, the principles of using water energy, rules for the technical operation of hydraulic structures, methods for obtaining and processing information on the state of the environment and engineering facilities, basic laws of environmental protection, laws and rules for the use of water and land resources. At the moment, the specialty of water resources and water use is in demand more than ever, given in the field of design, construction and operation of water management, irrigation and drainage and hydropower facilities.
11	List of competencies of the educational program:	Natural scientific and theoretical-ideological competencies; Social, personal and civic competencies; General engineering professional competencies Communication and IT virtual competencies

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12	Learning outcomes of the educational program:	To be able to navigate the current economic, political and cultural situation. Be able to communicate (orally and in writing) in a foreign language on professional and everyday topics. Be able to solve applied problems in the field of professional activity. To determine and recommend the most optimal method for the rational use and protection of water resources, design, construction and operation of water management and hydropower systems. Classify natural objects in the form of geographical components of geosystems of various levels: surface and underground waters, tropospheric air masses, natural- technological complexes, anthropogenic landscapes, populated areas, energy, health, recreational, historical, cultural and scientific facilities. Apply modern technology methods to the design, construction and operation of water management and hydropower facilities, complex hydroelectric complexes and hydraulic structures, hydroelectric and pumping stations; assess their economic efficiency and environmental safety, manage water management systems, and use technological methods for the operational management of water and other soil regimes. Conduct soil, hydrogeological, hydrometric, geodetic surveys, Process and use survey results, receive and process information on the state of the environment and engineering facilities. To use physical principles, mathematical algorithms of analysis and other fundamental sciences when carrying out scientific and applied research in the water management industry. Apply modern methods to solve water management problems, conduct soil, hydrogeological, hydrometric, geodetic surveys, process and use the results of the surveys, receive and process information on the state of the environment and engineering facilities.
13	Form of study	full-time
14	Duration of study	4 years
15	Volume of loans	240
16	Languages of instruction	Russian, Kazakh, English
17	Awarded academic degree	bachelor
18	Developer(s) and authors:	Absametov M.K., Auelkhan E.S., Tasbolat A.R.

4. 2. Interrelationship attainability generated results training By educational program And educational disciplines

No .	Name of the discipline	Brief description of the discipline	Number of credits	Formed learning outcomes (codes)								
				PO1	PO2	PO3	PO4	PO5	PO6	PO7		
Cycle general education disciplines												
Required component												
	Foreign language	To provide students with the opportunity to gain sufficient knowledge to become more fluent in everyday social and academic settings. Students work on improving pronunciation, expanding their vocabulary and grammar. Developing academic language skills.	5	v								
	Kazakh (Russian) language	The language material of the course is selected in such a way that the student, while mastering the vocabulary and grammar minimum, has the opportunity to become familiar with typical communicative situations and find himself in such situations, be able to correctly evaluate them and choose the appropriate model (strategy) of speech behavior.	5		v							
	Physical culture	Physical education as an academic discipline in the higher education system is designed to form a harmonious personality, capable of purposefully using various means of physical education , sports and tourism to maintain and strengthen health, psychophysical training and self-training for various types of sports.	2				v					
	Information and communication technologies	This course offers a curriculum designed to enhance students' basic knowledge of information and communications technology. It covers a full range of topics, focusing on developing practical skills in data processing, algorithms, and programming.	5			v						
	History of Kazakhstan	The aim of the course is to introduce students of technical specialties to the main theoretical and practical achievements of domestic historical science on the history of Kazakhstan, and to provide a comprehensive and systematic study of the main stages of the formation and development of Kazakhstani society.	5	v								
	Philosophy	"Philosophy" is the development of a holistic worldview that has evolved within the context of humanity's socio-historical and cultural development. It introduces the fundamental paradigms of philosophy teaching and education methodology in the classical and post-classical traditions of philosophy. Philosophy aims to develop sustainable life guidelines and the acquisition of meaning in one's existence as a special form of spiritual production.	5			v						
	Module of socio-	The aim of the course is the political socialization of students of the technical	3			v						

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	political knowledge (sociology, political science)	university, ensuring the political aspect of training highly qualified specialists based on modern world and domestic political thought.										
	Module of socio-political knowledge (cultural studies, psychology)	This course is designed for students majoring in Cultural Studies and is aimed at developing a social and humanitarian worldview as the basis for modernizing public consciousness through the development of cultural identity, the ability to analyze and evaluate cultural situations based on an understanding of the nature of cultural processes, the specifics of cultural objects, and the role of cultural values in intercultural communication.	5				v					
Cycle general education disciplines University component												
	HUM 136 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				v					
	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 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.	5				v					
	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.	5									
	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.	5				v					

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	CHE 656 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.	5					v						
Cycle of basic disciplines University component														
	MAT 101 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		v									
	PHY 468 Physics I	Objective: To develop an understanding of the modern physical worldview and scientific worldview, and to develop skills in applying knowledge of the fundamental laws and theories of classical and modern physics. Contents: Physical foundations of mechanics, molecular physics and thermodynamics, electricity and magnetism, oscillations and waves, optics , and the fundamentals of quantum physics.	5		v									
	MAT 102 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					v						
	GEN 429 Engineering and Computer Graphics	Objective: To develop students' knowledge of drawing construction and the skills to develop graphic and text design documentation in accordance with standards. Contents: Students will study Unified System for Design Documentation (ESKD) standards, graphic primitives, geometric constructions, orthogonal projection methods and properties, Monge diagrams, axonometric projections, metric problems, types and features of connections, creating sketches of parts and assembly drawings, detailing , and creating complex 3D solid objects in AutoCAD .	5					v						
	GEO644 Introduction to	The objective of this course is to provide the first step in training students in geological specializations such as engineering geologists, geologists,	4		v			v						

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	the Specialty	geophysicists, hydrogeologists, and other fields. Summary: This course provides students with basic theoretical skills in their chosen specialization, enables them to navigate the geology of combustible, liquid, and solid minerals, and enables them to understand and analyze basic concepts and terminology.										
	PHY 107 Applied Mechanics	Objective: To provide students with the fundamentals of solid mechanics and develop the skills to apply these fundamentals in practical work in their specialty. Contents: The force vector and its components. Force systems. Methods for specifying the motion of a point. The simplest motions of a rigid body. Planar motion of a rigid body. Complex motion of a point. Dynamics of a particle. Differential equations of motion of a particle. Dynamics of a system of particle points. D'Alamer's principle for a point point.	5		v							
	GEO645 Hydraulics in Water Management	Students will gain knowledge of the fundamental theoretical and applied issues of the fundamental laws of hydrostatics, types of motion, basic hydraulic flow parameters, the Bernoulli equation for the flow of a real fluid, fluid motion regimes, hydraulic calculations for pipelines, steady-state fluid motion in open channels, uniform fluid motion in canals, non-uniform fluid motion in prismatic channels, methods for processing data from hydrometric measurement work; types of surveys and studies conducted on rivers, lakes and reservoirs for the purpose of their integrated use.	6				v					
	G IG 115 Water chemistry and microbiology	The goal of this course is to acquire knowledge of the chemical, physical, and biological properties of water. It also explores the theoretical foundations of sedimentation, coagulation, sorption, and other methods. It also explores the role of microorganisms in the self-purification of water bodies and biological wastewater treatment.	5				v					
	MAP 475 Engineering Surveying	Objective: To develop theoretical knowledge and practical skills in the field of obtaining, processing and using geodetic information as the initial basis for making and implementing decisions in the design, construction and operation of engineering systems. Contents: Contains a full range of topics on the methods and means of producing geodetic measurements on the earth's surface, aimed at forming the foundations of engineering geodesy as a modern comprehensive fundamental science, and at developing skills in using ready-made planning and topographic materials in solving engineering and practical problems.	5			v						
	GEO552 Water Resources of the Earth	The objective of this course is to provide students with knowledge of natural waters, their reserves and distribution, their importance and role in society, their use in the national economy, and the impact of human activity on their regime and quality. The objectives include managing relationships in the study, exploration, rational and integrated use, and protection of water resources, irrigation and drainage systems, and water management structures.	5			v						
	GEO640 Water	The objective of this course is to acquire theoretical and practical knowledge in	5			v						

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	Cadastre	the field of rational use and protection of water resources. This course covers the general characteristics of natural water sources, their classification, and requirements for water supply sources. Students will become familiar with the objectives and scientific and technical policies in water management, as well as the main modern water issues. Students will also explore measures for the protection and rational use of water resources. Students will also explore natural water resources in Kazakhstan. Students will also learn about the Water Code of the Republic of Kazakhstan.										
	MCH111 Materials Science	The objective of this course is to acquire knowledge and skills in determining the structure, composition, and properties of materials used in the manufacture of machine parts. Subjects covered include the theory of metallurgy, the quality and properties of materials, ferrous and non-ferrous metals and their alloys, their structure, the iron-cementite phase diagram, metal and alloy production technologies, and methods for producing and processing metal and alloy products and non-metallic materials.	5				v					
	ELC186 Electrical Engineering	The purpose of the course is to master the theoretical foundations of electrical engineering, acquire knowledge about the designs, operating principles, parameters and characteristics of various electrical circuits and electrical devices, and prepare the student to understand the operating principles of modern electrical equipment.	5				v					
	GEO553 Water Energy Utilization	The goal of this course is to develop students' understanding of climate, water, and fisheries resource management, as well as their ability to make optimal decisions regarding the rational use of natural resources and water energy. The main objectives of this course are: - mastering the principles of climate, water, and energy resource management; - applying acquired knowledge to optimal decisions regarding the rational use of natural resources and water energy.	5		v							
	MNG 563 Fundamentals of Sustainable Development and ESG Projects in Kazakhstan	Objective: To provide students with theoretical foundations and practical skills in the field of sustainable development and ESG, as well as to develop an understanding of the role of these aspects in the modern economic and social development of Kazakhstan. Contents: Introduces the principles of sustainable development and the implementation of ESG practices in Kazakhstan, including the study of national and international standards, analysis of successful ESG projects and strategies for their implementation in enterprises and organizations.	5			v						
	GEO554 Hydropower Units	The course objectives are to acquire knowledge and skills to effectively utilize water resources in irrigation and drainage systems and hydroelectric power plants. The course objectives include studying hydroelectric power plants, their engineering and operational support, and methods for determining quantities characterizing fluid flow and its state.	5									

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	G IG 111 Pumps and pumping stations	Studies general information about pumps, pumping stations, operating parameters of pumps and water pipelines, design features and operation of pumping stations and their process parameters; types of pumping stations and their designs; water supply and sewerage pumping stations.	5									
	GEO514 Hydrogeology and Fundamentals of Geology	The purpose of mastering the discipline is to master the basic methods of geological and hydrogeological research, the first information about the material composition of the earth's crust - minerals and rocks and their formation, consideration, general characteristics of the main structural elements of the Earth, their structure and evolution, origin and factors in the formation of the composition, structure of the underground hydrosphere.	5									
	GEO575 Meteorology and climatology	The purpose of mastering the discipline is the theoretical development of the basic physical and chemical processes in the atmosphere, the patterns of geographical distribution of the Earth's climates. The development of the discipline is aimed at acquiring knowledge and understanding of the peculiarities of the formation of the radiation, thermal regimes of the atmosphere; the processes of evaporation, condensation (sublimation) of water vapor and their products; the baric field and wind; atmospheric circulation. To lay the foundations of the processes of climate formation and the role of geographical factors in the formation of the Earth's climates, to explain the principles of constructing various climate classifications.	5					v				
	G IG 112 Hydrology and flow regulation	The objective of this course is to develop students' systematic knowledge of the fundamentals of hydrology and flow regulation, which are necessary for the effective resolution of various water management issues related to water resource use. The objectives of this course include: acquiring a thorough theoretical understanding of the fundamentals of hydrological work using modern measuring instruments and hydrometric equipment, the installation of water gauging and hydrological posts, the organization of flow recording and monitoring in rivers and streams, and the use of the principles of water flow hydraulics in hydrometry and hydrology.	5					v				
	GEO518 Hydrogeochemistry	This course will examine the properties and composition of water, the water-rock-gas-living matter system, mass transfer in hydrogeochemical systems, and the compositional development of the main genetic types of groundwater. Hydrogeochemical zoning and the geochemistry of freshwater, as well as medicinal and industrial mineral waters, are described. Particular attention is paid to element migration, the specific processes of water composition formation in various geological settings, particularly groundwater in humid and arid regions and formation waters of terrigenous, carbonate, and sulfate deposits. Information on hydrogeochemical zoning and hydrogeochemical zoning is also provided.	5					v				

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MNG 562 Legal regulation of intellectual property	Objective: to form a holistic understanding of the system of legal regulation of intellectual property, including the basic principles, mechanisms for protecting intellectual property rights and the specifics of their implementation. Content: This course covers the fundamentals of IP law, including copyright, patents, trademarks, and industrial designs. Students learn how to protect and manage intellectual property rights and examine legal disputes and their resolution methods.	5					v				
GEO510 Hydrogeodynamics	The objective of the course is to acquire practical skills in solving problems in assessing surface and groundwater resources and their water intake, hydrodynamic problems related to the problems of forecasting water resources, designing dewatering and drainage systems, and operating water intakes of economic facilities and structures.	5					v				
GIG133 Fundamentals of Water Management Design	The primary objective of this course is to familiarize students with the methodology of designing water management systems. Course objectives: to master the basic principles of water management system (WMS) design; to develop skills in transitioning from the formation of the structure of water management complex participants to the design of a system of structures that meet water resource requirements; to develop an engineering formulation of the problem applicable to the designed water management system; to formulate a mathematical formulation of the design problem, to analyze the studied design solution options, and to select the recommended design option; to develop rules for managing multi-purpose reservoirs under operational conditions, and to develop a methodology for constructing dispatch schedules.	4									v
GIG116 Water intake structures	The purpose of this course is to develop a comprehensive knowledge base and prepare students for independent work in the field of water intake structures, familiarizing them with modern equipment and pumps. This course provides an understanding of the role and location of water intake structures, the selection of their location, the type and design of water intake structures, and the specific features of structures for specific conditions. It also examines the classification, fundamentals of theory, characteristics, control methods, and design, as well as the design and operational features of various water intake structures.	5							v		
GEO535 Groundwater Prospecting and Exploration	This course focuses on the study of groundwater deposits using basic hydrogeological research methods. Sections of the course cover the study of groundwater deposits worldwide and in Kazakhstan, their characteristics, and reserves. Key methods for assessing groundwater resources and reserves are also covered. Substantiation of groundwater intake layouts and the selection of promising sites are also covered. Particular attention is paid to methods for	4								v	

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		processing field filtration test results and calculating aquifer parameters; analyzing the hydrogeological situation using a hydrogeological map; defining the objectives and types of hydrogeological research; and selecting methods for assessing groundwater reserves.										
	GEO555 Water and Environmental Law	The objective of this course is to define the legal foundations, objectives, and principles, as well as mechanisms for implementing a unified state environmental policy. The objectives are to ensure a high level of environmental protection through state regulation aimed at preventing environmental pollution, preventing environmental damage in any form, and ensuring the elimination of the consequences of environmental damage, as well as gradually reducing the negative anthropogenic impact on the environment.	4							v		
	GEO556 Economic and Legal Foundations of Water Management	The objective of this course is to develop students' understanding of the complex international, national, and regional administrative, economic, technological, environmental, and legal measures aimed at environmental protection. Course objectives: 1. Study the main sources and mechanisms of pollution, 2. Study the spread of pollution, 3. Study the technology and equipment for cleaning emissions into the atmosphere and discharges into water bodies.	5						v			
	CSE831 Fundamentals of Artificial Intelligence	Objective: To introduce students to 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						v			
	GEO160 Groundwater Operational Exploration	The objective of this course is to study monitoring studies at existing groundwater intakes, methods for conducting hydrogeological surveys at intakes, and the study of groundwater quality characteristics and their changes under the influence of operation, as well as the reassessment of exploitable groundwater reserves based on the results of operational exploration. The objectives of this course include studying the methodology for conducting hydrogeological surveys at water intakes; studying groundwater quality characteristics and their changes under the influence of operation; and reassessing exploitable groundwater reserves based on the results of operational exploration.	5							v		
	GEO557 Water Economics	Economics of water management. - establishment of concepts and objectives of economics of nature management/water use, water management ; learn the methods: - economic assessment of natural/water resources;	6									

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		- economic assessment of environmental damage due to pollution of the environment/water bodies; - establishment of payments for nature use/water use and pollution of the environment/water bodies; - assessment of investment environmental/water protection projects; - feasibility study of water management measures										
GEO558 Economics and Management in Water Management	The purpose of mastering the course is to develop knowledge and skills in the field of effective economics, the organization of hydromelioration economics and the development of market relations, the selection of optimal options in the development and use of reclaimed lands and environmental protection.	6								v		
AAP173 Academic Internship	is designed to provide experience in primary professional activity, which ensures the preparation of students for the assignment of qualification categories in one or several working professions according to the profiles of the relevant programs	2		v								
Cycle of basic disciplinesComponent by choice Cycle of core disciplines (CD)												
GEO573 Hydraulic structures	This course examines hydraulic structures and water resource management facilities. It also examines the purpose of water intake structures and hydroelectric power plants. It also examines the design and construction of hydraulic structures.	4								v		
GEO 516 Agricultural water supply and pasture irrigation	Course objective : To know : water supply systems and schemes for populated areas and agricultural facilities; water consumption standards and regime; routing and design of water pipelines, water distribution networks and structures on them; regulation and reserve reservoirs; fundamentals of water supply for construction sites and irrigation of territories; To be able to: calculate and draw up working drawings of water supply networks and structures on them; apply the methodology of technical and economic justification of decisions taken; carry out work on the construction of water supply networks and structures, and their testing;	5								v		
GEO517 Integrated Water Resources Management	The main goal is to develop students' systematic knowledge of how to solve complex water management problems. This includes the concept and essence of integrated water resource management; principles of integrated water resource management; the water management complex and its participants; methods for compiling a water management balance; the concept of transition to sustainable domestic and drinking water consumption; and methods of state regulation of integrated water resource management in the Republic of Kazakhstan and abroad.	4								v		

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	GEO574 Irrigation Reclamation	The objective of this course is to develop students' knowledge, practical skills, and abilities in the theoretical foundations of regulating the water, air, heat, and salt regimes of soils, in combination with appropriate agricultural practices, to ensure optimal conditions for the growth and development of agricultural crops. Course objectives: - develop skills in determining and regulating soil moisture; - study the main types of melioration; the design, purpose, and operating principles of irrigation and drainage systems; - develop skills in determining the necessary parameters for the growth and development of agricultural crops and their cultivation using various melioration measures.	6								v	
	GEO559 Water Transportation	Water supply issues in populated areas, including water supply network systems and layouts, as well as network structures, are studied. Hydraulic calculations of water supply networks are performed, and estimated drinking water flow rates and pipeline diameters are determined.	5								v	
	GEO583 Water supply network	The objective of this course is to develop students' scientifically grounded understanding of water supply and distribution systems and the interrelationships between the operation of water supply and distribution systems. The objectives of this course include acquiring knowledge on determining the required water quantities for various water consumers and water consumption regimes, developing a clear understanding of the interrelationships between the operation of water supply and distribution systems, and gaining an understanding of the theoretical foundations and methods of hydraulically integrating water supply networks. This course also aims to provide students with knowledge of water supply network design.	5								v	
	GEO560 Water disposal and wastewater treatment	The objective of this course is to study the design of residential wastewater disposal systems and to develop students' skills necessary for calculating and designing residential wastewater disposal systems. The course's objectives include studying the design and development prospects of residential wastewater disposal systems, individual components of these systems and modern equipment, methods of operating and reconstructing these systems, the regulatory framework for the design and construction of residential wastewater disposal systems, methods for designing wastewater disposal networks and structures, and methods for selecting wastewater disposal system equipment.	4								v	
	GEO561 Drainage Systems and Structures	The objective of this course is to familiarize future water supply and sanitation specialists with industrial wastewater disposal systems and systems, modern methods of industrial wastewater treatment, and sludge processing. This course covers the fundamentals of industrial water use, industrial wastewater disposal systems and systems, the design, construction, and installation of wastewater networks, and the processes underlying industrial wastewater treatment methods and the treatment of sludge generated during their implementation.	5								v	

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GEO562	Improving the quality of natural waters	Improving the quality of natural waters. Indicators and requirements for the quality of natural waters. Methods and process flow charts for improving the quality of natural waters. Water clarification and decolorization. Coagulation of water impurities. Water settling. Water filtration. Disinfection of natural water, removal of odors and tastes. Water softening. Desalination and desalination of water. Removal of iron and manganese from water. Removal of dissolved gases from water. Water fluoridation and defluoridation . Water stabilization. Water desiliconization .	5								v	
GEO563	Water Treatment Plants	The objective of this course is to acquire knowledge of modern methods of water treatment for domestic and drinking water supply and technological needs; to acquire skills in assessing water quality and determining the need for its improvement depending on water use purposes; and to acquire skills in designing natural water treatment facilities.	6								v	
Cycle of core disciplines University component												
GEO564	Water Management for Industrial Enterprises	This course aims to prepare students for water supply and distribution at industrial facilities, collection and transportation of wastewater to treatment facilities, and treatment and conditioning of wastewater and sludge. The course also prepares students for research, design, production, technological, and operational activities in water supply and wastewater disposal at industrial enterprises across various sectors of the national economy.	5								v	
GEO565	Industrial Water Supply and Sanitation	The objective of this course is to acquire basic knowledge in the field of industrial water supply and wastewater disposal. The objectives of the course include learning about water supply and wastewater disposal systems at industrial enterprises and studying regulatory documents related to water treatment, as well as developing skills in working with design documentation and regulatory literature.	5								v	
GEO566	Technology and Organization of Hydraulic Engineering Construction	The objective of this course is to familiarize students with the specifics of hydraulic engineering and environmental protection, gain knowledge of the designs and technologies for constructing hydraulic structures with a focus on environmental requirements, study the design of technological and organizational measures during the construction of hydraulic structures, and apply this knowledge to solving practical problems in hydraulic engineering and environmental protection. The primary objectives of this course are to study the specifics of hydraulic engineering construction technology and the study of specialized hydraulic engineering construction technologies.	6									v
GEO 567	Plumbing Equipment for	The course "Building Sanitary Equipment" aims to train specialists in the design, installation, and operation, as well as scientific research, of sanitary systems for various buildings and their complexes. The course's objectives include acquiring	5									v

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	Buildings	technical and practical knowledge about cold and hot water supply systems, sewerage, and gas supply systems for various buildings and their complexes, and assessing the impact of these systems on building amenities and ensuring optimal working and resting conditions for people.										
	GEO584 Automation of Water Management Systems	The aim of the course is to automate the distribution of water resources, based on the implementation of a modern automation system, dispatch control and data collection, increasing productivity and labor efficiency, improving product quality, and eliminating human work in conditions hazardous to health.	5									v
	GEO 585 Water Systems Management	The purpose of mastering the discipline "Management of water management systems" is to form an idea of the principles of management of water management systems; methods of control and regulation of the main parameters in engineering systems and sewage treatment plants; general rules for the operation of water supply and sanitation systems, measures to prevent and eliminate the consequences of harmful effects of water; the principle of operation and design of instrumentation and automatic regulators used in the automation of water supply systems and drainage.	5									v
	GEO 569 Operation of Water Supply and Sanitation Systems	The course "Operation of Water Supply and Sanitation Systems" aims to develop social and professional competence that combines academic, professional, and social-personal skills to address management and maintenance methods, ensure the trouble-free, trouble-free operation of networks and equipment, and improve water supply reliability and wastewater treatment efficiency. The course aims to teach students how to make scientifically sound, calculation-based decisions on operational issues related to the operation of systems and equipment, as well as decision-making skills in the operation of water supply and sanitation systems.	5									
	GEO 568 Operation of water management systems and structures	The purpose of studying the discipline is to form knowledge of the rules and skills of control, start-up, commissioning and operation of elements of water supply and sanitation systems to ensure uninterrupted, reliable and economical operation of networks and structures.	5									v
	AAP 102 Industrial Internship I	The purpose of practical training (practice for acquiring primary professional skills and abilities) is to consolidate and deepen acquired theoretical knowledge; master the necessary skills and abilities in the chosen specialty; expand understanding of future professional activity, improve the student's information and communication skills, and teach the elements of observation and communication.	2				v					

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5. Curriculum of the educational program

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 No 10

WORKING CURRICULUM

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

2025-2026 (Autumn, Spring)
B082 - "Water resources and water use"
6B08001 - "Water resources and water use"
Bachelor of engineering and technology
full time (shortened after TVET) - 3 years

Discipline code	Name of disciplines	Block	Cycle	Total ECTS credits	Total hours	Lek/lab/pr Contact hours	In hours SES (including TSIS)	Form of control	Allocation of face-to-face training based on courses and semesters						Prerequisites
									1 course		2 course		3 course		
									1 sem.	2 sem.	3 sem.	4 sem.	5 sem.	6 sem.	

CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)

M-2. Module of physical training

KFK103	Physical culture III		GED, RC	2	60	0/0/30	30	E	2						
KFK104	Physical culture IV		GED, CCH	2	60	0/0/30	30	E		2					

M-3. Module of information technology

CSE677	Information and communication technology		GED, RC	5	150	30/15/0	105	E	5						
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M-4. Module of socio-cultural development

HUM134	Module of socio-political knowledge (cultural studies, psychology)		GED, RC	5	150	30/0/15	105	E	5						
HUM137	History of Kazakhstan		GED, RC	5	150	15/0/30	105	GE	5						
HUM132	Philosophy		GED, UC	5	150	15/0/30	105	E		5					
HUM120	Module of socio-political knowledge (sociology, political science)		GED, UC	3	90	15/0/15	60	E		3					

M-5. Module of anti-corruption culture, ecology and life safety base

HUM136	Fundamentals of anti-corruption culture and law	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					
MNG564	Basics of Financial Literacy	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					
CHE656	Ecology and life safety	1	GED, CCH	5	150	30/0/15	105	E		5					

CYCLE OF BASIC DISCIPLINES (BD)

M-7. Module of basic training

MAP113	Geodesy with the basics of topography		BD, UC	5	150	15/0/30	105	E	5						
GEO645	Hydraulics in the water sector		BD, UC	6	180	30/0/30	120	E	6						
GEO640	Water Cadastre	1	BD, CCH	5	150	30/0/15	105	E	5						
CHE950	ESG principles in inclusive culture	1	BD, CCH	5	150	30/0/15	105	E	5						
GIG115	Water chemistry and microbiology		BD, UC	5	150	15/15/15	105	E		5					
MCH111	Materials Science		BD, UC	5	150	30/15/0	105	E		5					
MNG563	Fundamentals of sustainable development and ESG projects in Kazakhstan	1	BD, CCH	5	150	30/0/15	105	E		5					
GEO554	Hydraulic power plants	1	BD, CCH	5	150	30/0/15	105	E		5					
ELC186	Electrical engineering		BD, UC	5	150	15/15/15	105	E			5				PHY111, PHY112
GIG111	Pumps and pump stations		BD, UC	5	150	15/15/15	105	E			5				

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GEO514	Hydrogeology and fundamentals of geology		BD, UC	5	150	30.0/15	105	E			5				
GEO575	Metrology, standardization and certification		BD, UC	5	150	30.0/15	105	E			5				
GKG112	Hydrology and flow regulation		BD, UC	5	150	30.0/15	105	E			5				
GEO518	Hydro geochemistry	1	BD, UC	5	150	30.0/15	105	E			5				
MNG562	Legal regulation of intellectual property	1	BD, CCH	5	150	30.0/15	105	E			5				
GEO510	Hydrogeodynamics	1	BD, CCH	5	150	30.0/15	105	E			5				
GKG116	Water intake facilities		BD, UC	5	150	15.0/30	105	E				5			
GEO535	Search and prospecting of subterranean waters	1	BD, UC	4	120	30.0/15	75	E				4			
GBN157	Sustainable water management	1	BD, CCH	4	120	30.0/15	75	E				4			
GEO556	Economic and legal foundations of water management	2	BD, CCH	5	150	30.0/15	105	E				5			
CSE831	Fundamentals of Artificial Intelligence	2	BD, CCH	5	150	15.0/30	105	E				5			
GEO160	Operational investigation of underground waters	2	BD, CCH	5	150	30.0/15	105	E				5			
GEO558	Economics and Management in the Water Economy		BD, UC	6	180	30.0/30	120	E					6		
M-8. Module of professional activity															
GKG133	Fundamentals of water management design		BD, UC	4	120	30.0/15	75	E						4	
CYCLE OF PROFILE DISCIPLINES (PD)															
M-7. Module of basic training															
GEO533	Meteorology and climatology	1	PD, UC	5	150	30.0/15	105	E		5					
GEO574	Irrigation reclamation		PD, UC	6	180	30.0/30	120	R					6		
GEO559	Transportation of water	1	PD, CCH	5	150	30.0/15	105	E					5		
GEO583	Water supply network	1	PD, CCH	5	150	30.0/15	105	E					5		
GEO560	Wastewater disposal and treatment	2	PD, CCH	5	150	30.0/15	105	E					5		
GEO561	Drainage systems and structures	2	PD, CCH	5	150	30.0/15	105	E					5		
GEO562	Improvement of the quality of natural waters	3	PD, CCH	6	180	30.0/30	120	E					6		
GEO563	Water treatment facilities	3	PD, CCH	6	180	30.0/30	120	E					6		
GEO564	Water management of industrial enterprises	4	PD, CCH	5	150	30.0/15	105	E					5		
GEO565	Industrial water supply and sanitation	4	PD, CCH	5	150	30.0/15	105	E					5		
M-8. Module of professional activity															
AAP102	Production practice I		PD, UC	2				R		2					
GEO573	Hydraulic engineering structures		PD, UC	4	120	30.0/15	75	E				4			
GEO516	Agricultural water and watering of pastures		PD, UC	5	150	30.0/15	105	E				5			
GEO517	Integrated utilization of water resources		PD, UC	4	120	30.0/15	75	E				4			
AAP183	Production practice II		PD, UC	3				R				3			
GEO566	Technology and organization of hydraulic engineering construction	1	PD, CCH	5	150	30.0/15	105	E					5		
GEO567	Sanitary and technical equipment of buildings	1	PD, CCH	5	150	30.0/15	105	E					5		
GEO584	Automation of water management systems	2	PD, CCH	5	150	30.0/15	105	R					5		
GEO585	Water management systems	2	PD, CCH	5	150	30.0/15	105	E					5		
GEO568	Operation of water management systems and structures	3	PD, CCH	5	150	30.0/15	105	E					5		
GEO569	Operation of water supply and sanitation systems	3	PD, UC	5	150	30.0/15	105	E					5		
M-9. Module of final attestation															
ECA103	Final examination		FA	8										8	
Additional type of training (ATT)															
AAP500	Military training														
Total based on UNIVERSITY:										33	32	30	30	33	27
										65	60	60			

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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	17	8	7	32
BD	Cycle of basic disciplines	0	70	10	80
PD	Cycle of profile disciplines	0	29	36	65
Total for theoretical training:		17	107	53	177
FA	Final attestation				8
TOTAL:					185

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes No 3 dated 28.12.2024

Decision of the Academic Council of the Institute. Minutes No 3 dated 28.12.2024

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

Zharugalyeva A. S.

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

Auzyelkhan V. .

Acting Department Chair - Hydrogeology, Engineering and
Oil and Gas Geology

Alqanbayev R. C.

Representative of the Academic Committee from Employers

Umbetaliev D. B.

____ Acknowledged ____



Note:

1. The departments themselves prescribe the names of the modules and their number for the basic training and professional activity module.
2. * - Division into types of work at the discretion of the department
3. If necessary, the disciplines: Physics II, Mathematics III, General Chemistry of the department are included at the expense of credits of the component of the department of BD, VK from the basic training module
4. The total academic load for one academic year must be 60 academic credits.
5. The application of the catalog of elective courses, just like the Curriculum, is divided into modules, with the inclusion of the R&D Module

