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M.Auezov South Kazakhstan University

« APPROVED BY»

 The Rector \_\_\_\_\_\_\_\_\_\_\_\_

 d.h.s., academician Kozhamzharova D.P.

«\_\_\_»\_\_\_\_\_\_\_\_\_\_20\_\_\_y.

[**Education Programme**](https://context.reverso.net/%D0%BF%D0%B5%D1%80%D0%B5%D0%B2%D0%BE%D0%B4/%D0%B0%D0%BD%D0%B3%D0%BB%D0%B8%D0%B9%D1%81%D0%BA%D0%B8%D0%B9-%D1%80%D1%83%D1%81%D1%81%D0%BA%D0%B8%D0%B9/Education%2BProgramme)

**6В08610-Water resources and water use**

|  |  |
| --- | --- |
| Registration number | 6В086000007 |
| Code and classification of the field of education | 6В08-«Agriculture and bioresources » |
| Code and classification of training areas | 6В086-« Water resources and water use» |
| Group of educational programs | В082-« Water resources and water use»  |
| Type of EP | active |
| ISCE level | 6 |
| NQF level | 6 |
| SQF of education level | 6 |
| Language of learning | Kazakh, Russian, English |
| Typical duration of study | 4 years |
| Form of study | Full time, evening, Distance learning  |
| The complexity of the EP,  | 240 credits |
| not less | - |
| Distinctive features of EP | - |
| University Partner ( JEP ) | - |
| University Partner ( TDEP ) | - |

Shymkent, 2021

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EP was considered by the Methodological Commission of the higher school of Аgricultural Sciences/ Considered by the Committee on Innovative Learning Technologies and Methodological Support, Protocol № \_\_\_\_\_ from \_\_\_\_\_\_2021 year.

Chairman of MC (Committee)\_\_\_\_\_\_\_\_\_\_\_\_\_ Absatova B.A.

Considered and recommended for approval at the meeting of Educational and Methodical Council of M. Auezov SKU.

protocol № \_\_\_ from \_\_\_\_\_\_\_\_\_2021 year

Approved by the decision of the Academic Council of the University protocol № \_\_\_from \_\_\_\_\_\_\_\_\_\_\_\_2021 year.

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**Introduction**

1. **Scope**

Designed for the implementation of bachelors training by educational program (hereinafter - EP) code "6B08610- "Water resources and water use»" in RSE on right of economic management "M.Auezov South Kazakhstan University" of RK MES.

1. **Regulatory documents**

Education Act of the Republic of Kazakhstan (as amended and supplemented on 07/04/2018);

Standard rules for the operation of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan from October 30, 2018 No. 595 (registered with the Ministry of Justice of the Republic of Kazakhstan on October 31, 2018 No. 17657);

State obligatory standards of higher and postgraduate education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan, October 31, 2018 No. 604;

The rules for the organization of educational process on credit technology education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan on April 20, 2011 No. 152 as amended and supplemented of October 12, 2018 No. 563

1. **Educational programs concept**

The goal of the educational program is coordinated with the mission of university and is aimed at preparing the intellectual elite of the country with advanced entrepreneurial skills, fluent in three languages, demonstrating conceptual, analytical and logical thinking skills, creative approach in professional activities, being able to work in national and international teams obtaining the lifelong strategy.

The educational program is harmonized with the 6th level of the National Qualifications Framework of the Republic of Kazakhstan, with Dublin descriptors, 1 cycle of the Framework for Qualification of the European Higher Education Area, also with Level 6 of the European Qualification Framework for Lifelong Learning.

The educational program is focused on professional and social order through the formation of professional competencies associated with the necessary types of research, practical and business activities, adjusted to meet the requirements of stakeholders.

The uniqueness of EP 6В08610 - «Water resources and water use»determined by the results of training, which are formed on the basis of Dublin descriptors and expressed through competence in the field of water and agriculture, fundamental mathematical,natural science, technical, educational, entrepreneurial training. The availability of modern material and technical base and qualified teaching staff allows not only to obtain good knowledge, but also to engage in scientific research in order to develop intellectual growth and further admission to the master's and doctoral programs.

The educational program aims to achieve learning outcomes through the organization of educational process using the principles of Bologna process, student-centered learning, accessibility and inclusion.

 Program learning outcomes are achieved through the following training events:

 - classroom training: lectures, seminars, practical and laboratory classes - held in view of innovative teaching technologies, the use of the latest achievements of science, technology and information systems;

 - extracurricular training: the independent work of the student, including under the guidance of a teacher, individual counseling;

 - conducting professional practices, implementation of course and diploma works (projects).

- (for postgraduates) SRWMS, SRWDS, ERWMS

The university has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination against students.

The quality of EP is ensured by the involvement of stakeholders in its development and evaluation, systematic monitoring and review of its content.

**4. Entry Requirements**

Established according to the Model Rules for admission to studies in educational organizations that implement educational programs of higher and postgraduate education by order MES RK №600 on 10.31.2018

**1. EDUCATIONPROGRAMMEPASSPORT**

**1.1 The purpose and objectives of education program by specialty**

EP objectives:training of competitive graduates in the field of water resources and water use for scientific, industrial and educational activities in the modern conditions of industrial development.

EP tasks:

**-** provision of conditions for obtaining high-quality professional education , professional competencies in various fields of water and agriculture;

- providing basic undergraduate training that allows you to continue learning throughout life, to successfully adapt to changing conditions throughout their professional careers;

 - ensuring the conditions for acquiring a high general intellectual level of development, mastering literate and developed speech, a culture of thinking and the skills of scientific organization of labor in the professional field;

 - formation of competitiveness of graduates in the field of water and agriculture, environmental management to ensure the possibility of their fastest employment in the specialty or continue their education at the next stages of training.

**1.2 List of qualifications and positions**

The graduate of this EP is awarded with degree of "bachelor of agriculture ". Bachelors by specialty 6B08610 - "Water resources and water use» can hold primary positions water resources specialist in (research institutions, design and design organizations) without making requirements for work experience in accordance with the qualification requirements of the Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Republic of Kazakhstan from May 21, 2012 No. 201.

**1.3 Qualification characteristics of the educational program graduate**

**1.3.1 Scope of professional activity**

The scope of professional activity is:

Water management enterprises, natural objects in the form of geographical components of geosystems of different levels, design organizations, supervision and control over the use of water resources, audit and monitoring of water resources.

**1.3.2 Objects of professional activity**

The objects of professional activity of graduates are:

- agricultural enterprises, state management organizations;

- water and hydropower systems, water and agriculture enterprises;

- hydraulic structures for various purposes: spillways, outlets, water intakes, hydroelectric power stations, pumping stations, fish protection facilities;

- research, design and engineering organizations.

**1.3.3 Subjects of professional activity**

Subjects of professional activity of the ЕР6B08610-"Water resources and water use» are: rivers, lakes, groundwater, treatment facilities, dams, reservoirs; hydraulic and hydropower facilities; irrigation and drainage network; estuary systems;

**1.3.4 Types of professional activity**

A bachelor by specialty 6В08610-"Water resources and water use» can do the following types of professional activity:

-design and engineering;

-industrial-technological;

-organizational and management;

-research and development;

**2. EP learning outcomes**

**РО 1** Communicate freely in a professional environment and society in Kazakh, Russian and English.

**РО2** Demonstrate natural science, mathematical, social, socio-economic and engineering knowledge in professional activities, methods of mathematical data processing, theoretical and experimental research, regulatory documents and elements of economic analysis.

**РО3** Possess information and computational literacy, the ability to generalize, analyze and perceive information, set goals and choose ways to achieve it.

**РО4** Be able to carry out hydrogeological, hydrometric, geodetic surveys; process and use the results of surveys; receive and process information about the state of the environment and engineering facilities

**РО5** Have the skills to organize and carry out works on the design, construction and operation of water and hydropower facilities, integrated hydroelectric and hydraulic structures, hydropower and pumping stations; reclamation and drainage systems, taking into account the legal documentation

**РО6** Be able to organize technical and material security of operation of the water treatment plant, water pumping station and water treatment facilities

**РО7** Be able to develop design documentation for the construction of water supply, sanitation and water purification systems

**РО8** To study and analyze the results of works on water use, to generalize and systematize them in order to ensure the safety of water facilities

**РО9** Participate in the assessment of water resources and facilities(including transboundary ones) using the principles of integrated water resources management

**РО10** Сarry out design, survey, research and design work, to develop long-term investment programs for the construction and reconstruction of hydraulic struct

**РО11** Сhoose the irrigation technology and the corresponding equipment and machinery soil-hydrological conditions of the land

**РО12** Work effectively individually and as a member of the team, correctly defend your point of view, adjust your actions and use different methods.

**3 COMPETENCES OF EP GRADUATE**

**3.1** Successful completion of training in EP contribute to the formation of the following competences of a graduate:

* core competencies (CC)
* professioanal competencies (PC).

***Core competencies:***

(КК1) in the field of *native language*

- the ability to express and understand concepts, thoughts, feelings, facts and opinions in the field of music education in written and oral forms (listening, speaking, reading and writing), as well as interact linguistically and creatively in a variety of social and cultural contexts: during study, at work, at home and at leisure;

(КК2)in the field of *foreign languages*

- ability to master basic communication skills in a foreign language - understanding, expressing and interpreting concepts, facts and opinions in the professional field, both verbally and in writing (listening, speaking, reading, writing) in the relevant range of social and cultural contexts, mastering skills mediation and intercultural understanding;

(КК3)*fundamental mathematical, scientific and technical training*

- the ability and willingness to apply educational potential, experience and personal qualities acquired during the study of mathematical, natural science, technical disciplines at the university, to determine ways of monitoring and evaluating the solution of professional problems, the development of mathematical and natural science thinking;

(КК4)*computer*

- the ability to confidently and critically use modern information and digital technologies for work, leisure and communications, mastering the skills of using, restoring, evaluating, storing, producing, presenting and exchanging information through a computer, communicating and participating in collaborating networks using the Internet for professional activities;

КК5 *social*

- the ability to own social and ethical values ​​based on public opinion, traditions, customs, norms and to be guided by them in their professional activities; know the cultures of the peoples of Kazakhstan and abide by their traditions; observe the basics of the legal system and legislation of Kazakhstan, know the trends of social development of society; be able to adequately navigate in various social situations; be able to find compromises, relate your opinion with the opinion of the team; own business ethics, ethical and legal standards of conduct; strive for professional and personal growth; work in a team, correctly defend their point of view, propose new solutions; demonstrate tolerance towards other individuals;

КК6 *economic, managerial and entrepreneurial*

- the ability to know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy; master the basics of economic knowledge; possess the skills of critical thinking, interpretation, creativity analysis, drawing conclusions, evaluation; manage projects to achieve professional goals, manage staff, demonstrate entrepreneurial skills.

КК7 *cultural training*

- the ability to know and understand the traditions and culture of the peoples of Kazakhstan, tolerance to the traditions and culture of other nations of the world, aware of the attitudes of tolerant behavior; not subject to prejudice, has high spiritual qualities, formed as an intelligent person

КК8*additional competencies*

- ability to master the skills of critical thinking, interpretation, creativity analysis, drawing conclusions, evaluation; have creativity and an active lifestyle; make professional decisions under conditions of uncertainty and risk.

|  |  |
| --- | --- |
| PC 1 | The ability to perform hydraulic calculations to justify the basic dimensions of the elements of structures in the design of waterworks and water management systems; |
| PC 2 | To know the methods of calculation of river flow formation, hydrological regime of water bodies, formation and movement of surface and underground waters; to have the skills to work with control and measuring devices and to process the results; |
| PC 3 | The ability to develop measures for the conservation, improvement of water bodies, rational use and protection of water resources; apply knowledge of management methods for the development and functioning of water management systems in the conditions of multi-purpose use of water resources, the principles of optimization of water use; |
| PC 4 | The ability to apply knowledge in the ecological and economic justification of the balanced use of water and land resources; to be able to link the parameters of irrigation systems with the requirements of the soil formation process, the physiological development of plants and the hydrological regime of the irrigation source; the ability to work on the design, construction and operation of irrigation and drainage systems; |
| PC 5 | To perform works on design and implementation of projects of restoration of natural condition of the rivers and reservoirs; examination of the projects influencing water and water facilities; |
| PC 6 | To participate in the verification of compliance with water legislation and rules for the protection of water resources, monitors the restoration of disturbed natural waters, participates in the regulation of relations between water users, the conduct of the state water cadastre; |

**3.2 Matrix mapping of learning outcomes at the OP in General, generated by the competence modules**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Р1** | **Р2** | **Р3** | **Р4** | **Р5** | **Р6** | **Р7** | **Р8** | **Р9** | **Р10** | **Р11** | **Р12** |
| КК1 | + | + |  |  |  | + | + |  |  |  |  |  |
| КК2 | + |  |  |  |  |  |  | + |  |  |  |  |
| КК3 |  | + | + | + |  |  | + |  |  |  |  |  |
| КК4 |  |  | + |  |  |  | + |  |  | + |  |  |
| КК5 |  |  |  |  | + |  |  | + |  |  |  |  |
| КК6 |  |  |  |  | + |  |  |  | + |  |  | + |
| КК7 |  |  |  | + | + | + |  |  |  |  |  |  |
| КК8 |  |  |  | + |  |  | + | + | + |  | + |  |
| ПК1 |  |  | + | + |  |  |  |  |  |  | + |  |
| ПК2 | + |  |  | + |  |  |  | + |  |  |  |  |
| ПК3 |  |  |  |  | + | + |  |  |  | + |  | + |
| ПК4 |  | + | + |  |  |  |  | + |  |  | + |  |
| ПК5 |  |  | + |  | + | + | + |  |  | + |  | + |
| ПК6 |  |  |  |  | + |  | + |  | + |  |  |  |

**4.** **A SUMMARY TABLE SHOWING THE VOLUME OF LOANS IN THE CONTEXT OF THE MODULES OF THE EDUCATIONAL PROGRAM**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Course of Study | Semester | The number of mastered modules | The number of studied disciplines | Number of KZ credits  | Total hours | Total KZ credits | The number of |
| ОК | ВК | КВ | Theoretical training | Educational practice | Industrial practice | Final examination | exam | different offset |
| 1 | 1 | 3 | 5 | 1 | 1 | 29 |  |  |  | 990 | 31 | 6 | 1 |
| 2 | 4 | 4 | 1 | 2 | 27 | 1 |  |  | 900 | 30 | 6 | 2 |
| 2 | 3 | 6 | 1 | 1 | 6 | 28 |  |  |  | 900 | 30 | 6 | 2 |
| 4 | 5 | 2 | 4 | 3 | 25 |  | 3 |  | 900 | 30 | 6 | 2 |
| 3 | 5 | 4 | 1 | 3 | - | 30 |  |   |  | 900 | 30 | 4 | - |
| 6 | 5 | - | 3 | 4 | 24 |  | 6 |  | 900 | 30 | 6 | 1 |
| 4 | 7 | 5 | - | 1 | 5 | 21 |  |  |  | 630 | 21 | 6 | - |
| 8 | 3 | - | - | 5 | 20 |  |  |  | 600 | 20 | 5 | - |
| 9 | 1 |  |  |  | 20 |  |  | 20 | 600 | 20 |  | 1 |
| Subtotal |  | 11 | 14 | 26 | 211 |  1 | 9 | 20 | 7200 | 240 | 44 | 9 |  |

**5. Information about disciplines**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Module name** |  **Cycle** | **ВК/КВ** | **Component Name** | **Brief course description****(in 30-50 words)** | **Number of credits** | **Formed РО (codes)** |
| Module of the social science | GED | OC | Contemporary History of Kazakhstan | It allows to classify the conceptual foundations of national history, to interpret the origins, continuity of the Kazakh state and the actual problems of the history of modern Kazakhstan. To analyze the activities of the national intelligentsia in the formation of the ideology of the liberation movement and the stages of socio-economic modernization of Kazakhstan. Describe the creation of a democratic state based on the rule of law. | 5 | РО2, РО1 |
|  GED  |  OC | Philosophy | Knowledge of the place and role of phylosophy in the life of society and man, the main stages of development of world and Kazakh philosophical thought, the position and category of philosophy for the evaluation and analysis of various social trends and facts.To analyze the features of Genesis and development of philosophical knowledge. | 5 | РО1,РО3 |
| Module of socio-political knowledge  | GED  |  OC/ | Social and Political Studies/  | To study the theory of sociology, social structure and stratification of society, explains the role and place of politics in society, examines the main stages of formation and development of political science, including youth policy, the role of politics in the system of public life, reveals the essence of the state, reveals the relationship between the state and civil society. | 4 | РО2, РО3 |
|  GED  |  HSC/EC | Ecology and Fundamentals of Life Safety/  | Knowledge and basic concepts laws of ecology;basic laws of functioning of living organisms, ecosystems of various organizations, the biosphere as a whole and their stability; to solve environmental problems of agro-industrial complexes,use personal protective equipment for emergencies and provide medical care to victims. | 3 | РО2, РО9 |
|  GED  |  HSC/EC | Fundamentals of entrepreneurhip skills and anti-corruption culture | Examines the features of the content of entrepreneurship in a particular field of activity. Introduces the features of state regulation of entrepreneurial activity. Forms skills of creation and registration of own business, development of constituent documents, business strategies, business plans. | 3 | РО7,РО9, РО10 |
|  GED  |  HSC/EC | Fundamentals of Economics and Law  | Examines the features of the content of entrepreneurship in a particular field of activity. Introduces the features of state regulation of entrepreneurial activity. Forms skills of creation and registration of own business, development of constituent documents, business strategies, business plans. |  | РО3,РО11 |
|  GED  |  OC/ | Cultural Studies and Psychology  | The basics of culture morphology are studied, the anatomy of culture is characterized and its semiotic character is revealed, the ideas about archaic culture in the territory of ancient Kazakhstan are given, the main stages of formation of the Kazakh culture are considered, the essence of the Kazakh culture in the context of modern world processes is revealed. | 4 | РО7,РО2 |
| Module of communicative mobility  |  GED  |  OC/ | Kazakh (Russian) language | Development of cognitive and communicative activity in the Russian (Kazakh) language in the areas of interpersonal, social, intercultural communication. Instilling the skills to discuss ethical, cultural, socially significant norms in discussions, the ability to work in a team, teamwork, flexibility, creativity. | 10 | РО1, РО6 |
|  GED  |  OC/ | Foreign Language  | In teaching a foreign language is the formation of intercultural - communicative competence of students in the process of foreign language education at a sufficient level (A2), the level of basic sufficiency (B1), the basic standard (B2). Depending on the level of preparation of the student at the time of admission, he can reach the level of C1, if the language level of the student at the start is higher than B1. | 10 | РО1,РО6 |
|  GED  |  OC/ | Physical training | Knowledge of the set of values, norms and knowledge created and used by society for the purpose of physical and intellectual development of human abilities, improving its physical activity and the formation of a healthy lifestyle, social adaptation through physical education, physical training and physical development. | 8 | РО6,РО5 |
| BD  | HSC | Professional Kazakh (Russian) Language  | Development of skills to extract the necessary information from the text, its interpretation in educational and professional communication. - Development of the ability to establish contacts at a professional level, competently build communication, based on the goals and situation of communication. | 3 | РО6,РО5 |
| BD  |  HSC  | Professionally Oriented Foreign Language  | Development of skills to extract the necessary information from the text, its interpretation in educational and professional communication. Development of the ability to establish contacts at a professional level, competently build communication, based on the goals and situation of communication. | 3 | РО1, РО3 |
| BD  |  EC  | Kazakh Alphabet Based on Latin Graphics  | Formation of the Kazakh sounds taking into account features of their pronunciation, studying of phonetic features of the Kazakh words and a phrase on the basis of Latin graphics. Development of literate writing skills based on the Latin alphabet. |  | РО1 ,РО3 |
| BD  | EC | Academic Writing  | Culture of speech and communication in the Kazakh language – the main provisions of the theory and practice of speech culture. Ability to correctly use and use the accumulated language material. Language means depending on the purposes, sphere and conditions of communication; to use stylistic possibilities of the Kazakh phonetics, vocabulary. |  | РО1, РО3 |
| BD  | EC | Mukhtar Studies | The study of actual problems of science, the definition of a modern approach to the work of the writer, literary criticism of Soviet ideology in yesterday's Soviet society. treat as abundant and develop a broader science. The knowledge and taste in the knowledge of heritage should be accompanied by the current freedom and independence. | 3 | РО7, РО12 |
| BD  | EC | Abai Studies | to know the main processes of studying the historical,cultural and literary context of the Abai era, the study of Abai's works in the Kazakh and Russian languages, the education of aesthetic taste by studying the artistic originality of literary texts of our time,the education of a sense of patriotism, and the uniqueness of artistic works of modern writers and poets. |  | РО12, РО9,РО10 |
| BD  | EC | Actual Problems and Modernization of National Awareness | Understanding of the history of formation and development of sociology and political science. Modern sociological and political theories. Problems of applied sociology, the structure of the political sphere of society. Methodology and methodology of sociological research. Sociology of personality and deviant behavior. Sociology of labour and Economics. |  | РО12, РО7 |
|  GED  |  OC/  | Information and Communication Technologies (in English)  | Use information resources for search and storage of information;know what economic and political factors contributed to the development of information and communication technologies; features of information systems. | 5 | РО3,РО1 |
|  The Foundition of speciality | BD  |  EC  | Introduction to Speciality  | considers the concept of the world water balance; static, renewable and available water resources of the Republic of Kazakhstan and the world; water availability of territories; natural and anthropogenic factors of impact on water resources and the impact of water facilities on the natural and ecological environment; | 3 | РО3,РО5,РО12 |
|  BD  |  EC  | Сontent ant Language Integrated Learning  | to learn the basic concepts of the formation and development of competencies related to the understanding of the technology of subject-language learning; to know the basic terms necessary for the implementation of bachelors of scientific and professional activities in accordance with their specialization. |  | РО3,РО1 |
| BD  |  EC  | Ecology of Water Resources  | knowledge of standards and criteria for assessing the quality of natural waters; organization and monitoring of natural waters, water legislation, the formation of technical and economic analysis and management of water management complex, water protection measures. | 4 | РО4, РО 8, РО7 |
| BD  |  EC  | Landscape-ecological melioration  | considers the concept of the use of natural landscapes for economic purposes, classification of land landscape. Assess the suitability of land for agricultural, forestry, water use, recreation, etc. Systematization of land landscape, agricultural type of land. |  | РО4, РО8, РО7 |
| BD  |  EC  | Educational Practice | consolidation of theoretical knowledge and acquisition of practical skills by students in the production of land reclamation works, the formation and practical consolidation of knowledge in the field of rational use and protection of water resources, the development of water management of the country on the basis of environmental understanding of professional activity. | 1 | РО4, РО2 |
|  General Engineering Sciences | BD  |  HSC/EC |  Mathematics  | Knowledge of elements of linear algebra and analytical geometry, mathematical analysis and probability theory; Ability to use theoretical material (formulas, definitions, theorems) in practical classes; Modeling of applied problems;Solution of typical mathematical problems/ Choice of method for solving the problem | 4 | РО2, РО3 |
| BD  |  HSC/EC | Physics | deep and solid assimilation of classical mechanics taking into account vibrations and waves, continuum mechanics; fundamentals of MCT, thermodynamics and transport phenomena; fundamentals of electrodynamics, Maxwell's theory; wave and geometric optics; fundamentals of quantum physics; | 4 | РО2,РО3 |
| BD  |  EC  | Auto Cad in Waterworks Design  | methods and methods of construction of geometrical images, graphic representation of scientific and technical information, performance of technical schemes and drawings, basic skills in the graphic editor AutoCAD,formation of skills of construction and reading of machine-building, construction drawings, development of design documentation according to standards ESKD are considered.; | 4 | РО3,РО5 |
| BD  |  EC  | Engineering and Computer Graphics | methods of formation of spatial representations and improvement of graphic skills of display of objects on working drawings, formation of quality of devil's literacy, methods and ways of construction of shadows, prospects, plans, facades, sections, drawings in projections with numerical marks, simple architectural and construction drawings are considered. |  | РО3,РО5 |
| BD  |  EC  | Geoinformation Systems in Water Use | Knowledge and understanding of basic concepts in geographic information systems, the structure of GIS as an integrated system, the functionality of modern GIS, GIS place among other automated systems, GIS tools, purpose and capabilities, the Main GIS packages currently used and their characteristics. | 4 | РО3,РО6, РО10 |
| BD  |  EC  | Information technologies in Water Use | Provide information in the field of environmental technology. Understanding about spatial information. Modeling and analysis of natural and man-made processes. understanding the characteristics of the processes of collection, transmission, processing and accumulation of information using a PC, information resources and sources of knowledge in the electronic environment; |  | РО3,РО6, РО10 |
| BD  |  EC  | Technical Mechanics  | knowledge and understanding of the principles of standard mechanisms, the basics of mechanics of materials, mechanics of mechanisms and machines in relation to the power industry;to know the methods of calculations for strength and stiffness of structural elements, machine parts and devices;to carry out the formulation and solution of problems in the field of mechanics, experience in design work. | 4 | РО6, РО4, РО10  |
| BD  |  EC  | Engineering Mechanics  | have an idea of the principles of standard mechanisms, the basics of mechanics of materials, mechanics of mechanisms and machines in relation to the power industry;use methods of calculations for strength and stiffness of structural elements, machine parts and devices; |  | РО6, РО2, РО10 |
| BD  |  EC  | Geodesy | General information on geodesy, cartography and topography, as well as methods for determining the geodetic coordinates of individual points of the earth's surface are considered. Topographic surveys, leveling and breakdown of axes of hydraulic structures; | 4 | РО4,РО5,РО10 |
| Hydraulics and Hydrotehnical constructions | BD  |  HSC/EC | Hydraulics | knowledge and understanding of the basic laws of fluid equilibrium,the basic laws of motion of continua,modes of motion of liquids and structural features of the flows of these media. To make calculations of equilibrium of liquids, their movement in pipelines and channels, their expiration through apertures and nozzles. | 5 | РО5, РО6, РО12 |
| BD  |  HSC/EC |  Hydrology and Drain Regulation | The importance of hydrology and flow regulation for the development of the national economy, integrated use of water resources and their protection. Methods and devices used in hydrometric measurements on rivers, irrigation and drainage systems. | 4 | РО4, РО6, РО12 |
| BD  |  EC  |  Hydraulics of Constructions | ability to perform hydraulic calculations of channels and other water-supply hydraulic structures and waterworks, determine the shape and size of their cross sections, bottom slope and capacity of the structure; | 4 | РО5, РО6, РО12 |
| BD  |  EC  | Hydraulics of Open Channels  | knowledge of the basic physical properties of the liquid, the General laws and equations of hydrostatics and hydrodynamics; methods of calculation of hydraulic resistances moving fluid in open channels; perform hydraulic piping calculations, fluid flow calculations from holes and nozzles, fluid filtration calculations. |  | РО5, РО6, РО12 |
| BD  |  EC  |  Engineering Hydrometrics  | to teach how to make and understand the hydrological characteristics of rivers and their basins, to conduct hydrological observations and measurements, to determine the water and ice regime of rivers, to conduct hydrological calculations of the main characteristics of rivers, mainly floods and floods. | 5 | РО4,РО5,РО8 |
| BD  |  EC  | Operational Hydrometry | understanding of the use of hydrometric devices for measuring water levels, depths, velocities and direction of flows, the profile of the bottom of the water flow, water flow and sediment (bottom and suspended); on the organization and methods of hydrological observations and studies. |  | РО4,РО5,РО8 |
|  ChD  | HSC/EC | Hydrotehnical Constructions | knowledge of the main parameters and types of hydraulic structures; knowledge of management methods for the development and functioning of hydraulic structures in the conditions of multi-purpose use of water resources; determine the design parameters of hydraulic structures for the restoration of water bodies; design the construction of hydraulic structures | 3 | РО4,РО5,РО10 |
| BD  |  EC  | Hydropower-Plants | the study of the principles of operation and design of different types of pumps and turbines, the use of different types of energy sources. Turbine and pumping equipment. Design and construction of pumping units taking into account energy and economic factors. | 5 | РО10,РО8, РО5 |
| BD  |  EC  | Hydraulic Machine | understanding of the purpose, design, operating principles and applications of hydraulic machines and compressors used in oil and gas production, collection and preparation of well products, transportation and storage of hydrocarbons. Ability to repair and control and regulate the performance of hydraulic machines and compressors. |  | РО10,РО8, РО5 |
|  ChD  |  HSC  | Industrial Practice I  | acquisition of production skills of works at the enterprises of water management, safe methods of work, scientific organization of work. Consolidation and deepening of knowledge about the factors and regularities of river flow formation, river and lake regimes, methods and technical means of measuring and determining the main hydrological characteristics of watercourses. | 3 | РО3,РО4,РО6 |
|  Integrated water resources management  | BD  |  EC  | Complex use of Water Resources | to teach students the basic methods of calculation and design of water management systems, rational use of water resources, the development of measures to reduce unproductive water consumption, as well as the right to pretend in practice water protection measures aimed at protecting water bodies. | 5 | РО6,РО8,РО10 |
|  BD  |  EC  | Fundamentals of Business  | Knowledge of legislative and regulatory acts regulating entrepreneurial activity in the territory of the Republic of Kazakhstan; classification of risks in entrepreneurship and methods of their assessment ability to analyze entrepreneurial activity and evaluate its effectiveness, to make decisions on the organization and functioning of entrepreneurial activity | 3 | РО12,РО9 |
| BD  |  EC  | Commercialization and Business Planning  | Develops skills to assess the effectiveness of business ideas, commercial use of the results of Research and development work and development, contributes to the planning of the main stages of production of a new product. Studies types of intellectual property, strategies of commercialization of technologies, promotes formation of experience of management of process of development and advance of a new product at the choice of sources of financing |  | РО12,РО9 |
| BD  |  EC  |  Search and Investigation of Underground Water  | To study of classification of groundwater deposits and structural features, methods of their search, exploration and calculation of reserves, taking into account the requirements of the state Commission on groundwater reserves. Develop economic and environmental aspects related to the anthropogenic impact on surface and groundwater. | 4 | РО4, РО5, РО8 |
| BD  |  EC  | Surface and Groundwater Monitoring  | knowledge about monitoring of water bodies, the basin monitoring, objectives, monitoring of water use. Study on the legislative basis of groundwater monitoring. Assessment of the impact of pollution of groundwater and surface water, local water supply system. |  | РО4, РО5, РО8 |
|  ChD  |  EC  | Water resources and water supply of the territory of the Republic of Kazakhstan  | Understanding of water resources and water supply of the territory of Kazakhstan, knowledge of the concepts of surface and underground runoff, the laws of the main hydrogeological structures, evaluation and location of deposits, conducting hydrogeological zoning. | 6 | РО3, РО4, РО9 |
|  ChD  |  EC  | Surface and underground water resources of Republic of Kazakhstan  | Formation of underground and surface water sources of the Republic of Kazakhstan. Water economy of RK. The ability to make a balance of surface and groundwater, assessment of the potential of surface water, water basins of Kazakhstan. |  | РО3, РО4, РО9 |
| BD  |  EC  | Water cadastre and monitoring  | Knowledge of water management systems and complexes, the impact on water resources of various sectors of the economy, global climate change, the problems of small and large rivers, inland seas and lakes, and other problems of water management. | 5 | РО3, РО4, РО9 |
| BD  |  EC  | Water resources monitoring | Knowledge of monitoring and reserves of water resources distribution over the territory and in time, world water balance, water availability of territories, natural and anthropogenic factors of impact on water resources and the impact of water management facilities on the natural and ecological environment. |  | РО3, РО4, РО9 |
| BD  |  EC  | Wastewater and wastewater treatment | Information about drainage systems and the composition of wastewater, materials for familiarization with the purpose, conditions and principles of operation, designs, methods of calculation and design of drainage networks, pumping stations, treatment facilities. Know the methods and technological schemes of wastewater treatment and sludge treatment. | 3 | РО7, РО6, РО9 |
| BD  |  EC  | Industrial wastewater treatment | Knowledge of water quality indicators, natural water treatment technologies, equipment used for water treatment, chemistry of water treatment processes, basic methods and equipment for industrial and domestic wastewater treatment. Be able to determine the main indicators of water quality, choose technological schemes, calculate and draw the main units of equipment, calculate the amount of wastewater, its contamination, and treatment efficiency. |  | РО7, РО6, РО9 |
| BD  |  EC  | Industrial Practice II  | Obtaining professional skills in the field of land reclamation, creation of integrated water management systems and protection of water resources. To carry out work on the implementation of projects for the creation of modern high-performance technically advanced engineering water and hydropower systems, systems of water intake, supply and distribution. | 6 | РО4, РО6, РО8, РО10 |
| Agricultural water supply  |  ChD  |  EC  | Engineering systems of water supply and sanitation | knowledge of the main directions of development of systems of water supply and sanitation of buildings, constructions of settlements and cities, elements of these systems, the modern equipment of systems of water supply and sanitation, the place of its design, operation and reconstruction; to carry out hydraulic calculations of pipelines, dead-end and ring water supply networks; | 4 | РО7,РО6,РО9 |
|  ChD  |  EC  | Engineering Networks Water Management Construction | the ability to design buildings, water supply facilities, to properly develop the water supply scheme, engineering buildings of sewage treatment plants. Knowledge of the basic parameters of wells, the design process of treatment facilities, own a variety of methods of calculation of water supply networks and structures. |  | РО7,РО6,РО9 |
|  ChD  |  HSC  | Agricultural Water Supply and Irrigation Pastures  | Knowledge of water supply systems and schemes. Elements of water supply systems, the composition of water supply facilities to analyze and assess the reliability of agricultural water supply systems and watering pastures using hydrocyclone and hydrocyclone pumping units. | 4 | РО5 ,РО7 РО10 |
|  ChD  |  HSC  |  Pumpings, Pumping Stations and Water Intakes  | Understanding about pumps, pumping stations and pumping stations, vane pumps. To have a notion of the waterworks pumping stations in irrigation systems when water from open sources and the flow of water in channels, stations,supplying water in closed irrigation network and drainage pumping stations. | 5 | РО6, РО8, РО11 |
|  |  ChD  |  HSC  | Sanitary and technical equipmentof agricultural production buildings | mastering technical and practical information on systems of cold and hot water supply, Sewerage and gas supply of buildings for various purposes and their complexes; - assessment of the impact of these systems on the improvement of buildings and ensuring optimal working and recreation conditions; - assessment of the impact of these systems on the environment; - rational use of energy resources | 3 | РО6, РО7, РО9 |
|  ChD  |  HSC  | Water intake structures for surface and underground waters | Requirements for water supply sources, directions of surface water use. Water intakes from rivers: application conditions, factors influencing the choice of the type and design scheme of water intake structures. Characteristics of the hydrological regime of surface water bodies that are taken into account when designing water intake structures. |  | РО6, РО7, РО9 |
| Operation and management of water management |  ChD  |  EC  | The Water and Water Taking Away Networks | study of the design of construction and operation of facilities and equipment of water supply and sanitation. Analysis of water supply and sanitation systems as a complex of life support of cities and populated areas. Study of principal technical solutions and operation of external networks and structures of water supply systems. | 3 | РО4, РО5, РО8 |
|  ChD  |  EC  |  Management of Water systems | The concept of control theory. Essence of management. Terms and concepts of management science. Management principle. Functions and methods of management. Construction management functions. Construction management methods. Organizational management structures. Decision as a product of managerial work. Increase of productivity of administrative work. Automated control system. |  | РО10, РО12, РО9 |
|  ChD  |  EC  | The Operation of Water Management Facilities and Systems | have the concept of operation of water intake facilities, water supply networks, water treatment facilities. To carry out a methodology for calculating the capacity of water supply and drainage systems. Water regulation. Classification of systems. Technical level of systems. Operational requirements for technical devices of reclamation systems. | 4 | РО10, РО12, РО9 |
|  ChD  |  EC  | Operation of Water Supply and Sewerage Systems  | Selection of pumping equipment according to the characteristics of the network and pumps. To carry out the method of calculation of drainage channels. Operational requirements for technical devices of reclamation systems. Water regulation.Classification of systems. Technical level of systems. |  | РО10, РО12, РО9 |
| BD  |  EC  | Automation of Water Bodies  | Understanding of the design and operation of the most common automation systems used in reclamation and water management;to know the basic approaches and principles of automation of water management systems, the device in systems of elements and devices of automation, methods of drawing up automatic systems of measurement, control of production parameters. | 3 | РО6, РО10, РО9 |
| BD  |  EC  | Computer-aided design of water supply systems  | have an idea of the structure and operation of automation systems used in water supply; the basic approaches and principles of automation of water management systems, the device and automation devices, methods of compiling automatic systems of measurement, control, protection and regulation of the most important production parameters; |  | РО6, РО10, РО9 |
| Use of irrigating and drainage system | ChD  |  EC  | Use of Water Energy | Knowledge of the basic parameters and type of hydroelectric power station;know the design and workflow of turbines;. Determine the main parameters of hydraulic turbines and pumps,calculate the basic parameters of hydroelectric power plants. Principles of formation of natural and technical systems in hydropower. | 3 | РО6, РО10, РО9 |
|  ChD  |  EC  | Innovative resource-saving water supply systems  | Understanding of the principles of formation of resource-saving water supply systems. Types of innovative technologies. Special types of flow control and power generation. Daily mode of operation of HPP with limited daily regulation. Innovative resource-saving water supply and sanitation systems. |  | РО6, РО10, РО9 |
|  ChD  |  EC  | Irrigation and Drying Meliorations  | Tasks of irrigation and drainage reclamation. Main parameters and types of irrigation. Irrigation and drainage mode. Graph module for rotation. Irrigation methods and irrigation equipment. The main parameters, the principle of operation of irrigation technique on furrows and strips. | 5 | РО11, РО10, РО5 |
|  ChD  |  EC  |  Agricultural Meliorations | Basic principles of irrigation methods. The main elements of agricultural land reclamation. Hydraulic calculation of channels. Purpose and types of hydraulic structures. Irrigation system. Irrigation with sewage. |  | РО11, РО10, РО5 |
|  |  ChD  |  EC  | Drainage systems | Know the basic filtration theories, the construction classification of soils and their basic physical and mechanical properties, the theory of designing soil dams, the basics of hydraulic calculations, the basics of Geology and hydrogeology. conduct simple hydraulic and filtration performed a calculation to know the methods of constructing mathematical models of processes and phenomena | 3 | РО5, РО7, РО9 |
|  |  ChD  |  EC  | Water Supply system | knowledge of the regulatory framework in the field of engineering surveys, principles of design of buildings, structures, engineering systems and equipment, planning and development of settlements, knowledge of the principles of design of systems and equipment for water supply and sanitation | 3 | РО6, РО8, РО9 |
|  Water quality improvement |  ChD  |  EC  | Water Quality Improvement  | Perform basic calculations of water supply and sanitation systems of internal and external networks; Understanding the main directions and prospects of development of water supply and sanitation of buildings, structures and settlements and cities. | 4 | РО6, РО8, РО9 |
|  ChD  |  EC  |  Purification of Natural and Waste Water | To study of technologies and processes of natural water treatment for drinking water supply and technological needs, as well as wastewater treatment. To determine the main indicators of water quality, to make a choice of the device and to calculate technological parameters of process taking into account implementation of tasks of energy and resource saving. |  | РО5, РО7, РО9 |
|  ChD  |  EC  |  Design of Water Management Systems | Familiarization with the methodology of designing water management systems in the following areas: composition and structure of the project organization, development and comparison of water supply options of water management complex on the basis of rational distribution of available water resources among consumers: principles of integrated water resources management. | 5 | РО10,РО7, РО11 |
|  ChD  |  EC  | Design of Water Supply Systems | Knowledge of methods of design of water supply systems of settlements and industries. Methods of selection of the equipment; directions and prospects of development of water supply systems, to choose standard circuit solutions of water supply and sanitation systems |  | РО10,РО7, РО11 |
| BD  |  EC  | Water Treatment | Ability to make constructive and verification calculations, to choose optimal modes of operation of water treatment and water purification installations'. Provide information on the role of water treatment plants in the structure of thermal power equipment of TPP, CHP, nuclear power plants, industrial enterprises and heating networks; | 4 | РО10,РО7, РО11 |
| BD  | EC  | Chemical Methods of Processing of Water | knowledge of the main chemical methods of water treatment: to determine the quality indicators of natural waters, the composition of impurities of natural waters, methods and technological schemes to improve the quality of natural waters. analyze the main processes of water treatment, layout and design of water treatment facilities. |  | РО10,РО7, РО11 |
| Module acquisition of new professional competencies | BD  |  EC  | Minor program | To be able to inspect water intake and spillway structures of technical water supply of the enterprise. Be able to carry out geodetic works on hydraulic structures. To organize performance of works on measurement of levels and temperature of water in the channel, in drainage systems and piezometric wells, sampling of these waters for the chemical analysis; to carry out actions for protection and rational use of water resources. | 12 | РО6, РО7, РО9, РО11, РО12 |
| Module of final certification |  ChD  |  HSC  | Predegree or Industrial practice | to collect the actual material on production activities and practical material on the theme of the thesis; geographical location and detailed characteristics of the location of production; get acquainted with the purpose of the object, its working, optimal parameters, as well as the equipment used (power, equipment performance; principle of operation; the advantages of this type of equipment, dimensions | 8 | РО4,РО7,РО10, РО11 |
|  |  | Writing and defence of degree work (project) or passing a graded exam  | to carry out hydrogeological, hydrometric, geodetic surveys; to process and use the results of surveys; to receive and process information on engineering objects; to organize and conduct design, construction and operation of water and hydropower facilities, complex hydroelectric and hydraulic structures, hydropower and pumping stations; | 12 | РО4,РО7,РО10, РО11 |

**6. APPROVAL SHEET**

 the Educational program 6В08610-"Water resources and water use»

Director of AID\_\_\_\_\_\_\_\_\_\_\_\_\_\_G.Omashova

Head of ASD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Zhangabaev N.Zh

Head of DNPiK \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bazhirov T.S.