Non-Commercial Joint-Stock Company
"Kazakh National Agrarian Research University"

«AGREED»
Head of the «Big Almaty Channel»
named after D.Kunaeva
_____ S.Mukataev
«_27_» _____06_____ 2022

«AGREED»
Head of the RSU "Balkash-Alakol basin
Inspection"
_____ R.Imanbet
«_27_» _____06_____ 2022

«APPROVED»
Acting Chairman of the Board -
Rector
_____ E.Islamov
_____ 2022

EDUCATIONAL PROGRAM

«6B08601 - Water resources management»

Awarded degree: Bachelor of agriculture under the educational programme
«6B08601 - Water resources management»

Almaty 2022

The educational program was reviewed and recommended for approval at the meetings:
Of the Academic Council of KazNARU, protocol № 1 « 29 » 08 2022.

Educational and Methodological Council of the University,
protocol № 1 « 26 » 08 2022.
Chairman of the UMC University B. Kalykova

Academic Committee of the Faculty of «Water, Land and Forest Resources»
protocol № 11 « 27 » 06 2022.
Chairman of the AC of faculty L.Makhmudova

Approved at the meeting of the department «Water resources and melioration»
protocol № 11 « 27 » 06 2022.
Head of the department Ye.Zhaparkulova

Developers:

Position	**Signature**	**Full name**
Dean of the faculty		Ye.Sarkynov
Head of the department		Ye.Zhaparkulova
Director of the Department of Remote Sensing and Environmental Expertise		Ya.Chormansky
PhD., assos.professor		B.Zulpykharov
Student VR-413k		U.Barlybai
A graduate of 2022		N.Baimoldina

Employers:

Head of the «Big Almaty Channel» named after D.Kunaeva		S. Mukataev
Head of the RSU "Balkash-Alakol basin Inspection"		R.Imanbet

Agreed:

Position	**Signature**	**Full name**
Head of training division		A. Koyshibayev
Head of the Department of Educational and Methodological Work and Quality of Educational Programs		Zh. Kussainova
Director of the Department of Academic Affairs		A.Satmurzaev

Application area

It is intended for realization of preparation of bachelors under the educational program "6B08601 - Water resources management" in NCJSC "Kazakh National Agrarian University".

Regulations

«On Education» The Law of the Republic of Kazakhstan dated 27 July, 2007 No. 319-III;

Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 №2;

Classifier of training programs for personnel with higher and post-graduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan of October 13, 2018 No. 569;

Standard Rules for the activities of educational organizations implementing educational programs of higher and (or) postgraduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan of October 30, 2018 No. 595;

Rules of the organization of the educational process on credit technology of training. Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 12, 2018 No. 563;

Algorithm of inclusion and exclusion of educational programs in the Register of educational programs of higher and postgraduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan No. 665 dated December 4, 2018;

Professional standard. Appendix No. 72 to the order of the Deputy Chairman of the Board of the National chamber of entrepreneurs of the Republic of Kazakhstan "Atameken" dated 11.12.2018 No. 339

1. Passport of the educational program

Code and classification of the field of education	6B08 Agriculture and bioresources
Code and classification of training areas	6B086 Water resources and water use
Code and name of the educational program	6B08601 - Water resources management
Type of educational program	Acting
The purpose of the educational program	Training of competitive specialists of water management with knowledge of integrated water resources management and rational water use in agricultural sectors using the achievements of IT-technologies
Level according to (I S C E)	6
Level according to NQF	6
Level according to SQF	6
The number of applications for licenses for the training	KZ42LAA00006720, №009, March 27, 2019 year
Accreditation of EP The name of the accreditation body The period of validity of accreditation	Certificate №1920 KE 0125 KazSEE 13.12.2019 -12.12.2024.
Awarded degree	Bachelor of Agriculture under the educational programme «6B08601 - Water resources management»
Learning outcome	Table 2
List of qualifications and positions	1. hydrologist engineer 2. hydraulic engineer
Professional field of activity	control of water consumption and water disposal norms, monitoring of the hydrological regime and their rational use, maintaining state monitoring of surface water bodies, maintenance and operation of water management systems and structures, construction and ensuring safety of water management facilities, provision of maintenance, repair and restoration of inter-farm canals and irrigation and drainage facilities, repair and restoration of especially emergency sections of inter-farm canals and hydromeliorative structures
Field and object of professional activity	• surface and groundwater bodies and inspections • irrigation and drainage systems of irrigated lands • hydraulic structures • project, survey, research, design organizations
Functions of professional activity	• Design, construction and operation of water facilities • Conducting state monitoring of surface water bodies, state accounting of waters and their use • Irrigation and drainage systems design, monitoring and assessment of irrigation and drainage conditions of irrigated lands

	• Organization and management of work of the project, water, hydropower, agricultural, municipal organizations and enterprises; • Perform research work in educational institutions and research centers of water, agriculture and energy management; • Examination, supervision and control over the use of water resources, audit and monitoring of water management facilities, etc.
Types of professional activity	**1. Evaluative:** 1. Conducting state monitoring of surface water bodies, state accounting of waters and their use; 2. Calculation of specific norms of water consumption and water disposal; **2. Constructive:** 1. Development of schemes for the complex use and protection of water resources **3. Information technology:** 1. Development of measures for water users to preserve and improve the state of water bodies; 2. Development of a water resources rational use plan;
Be competent	Maintenance of the state monitoring of superficial water objects, state account of waters and their use Design of irrigation and drainage systems, monitoring and assessment of the hydro-reclamation status of irrigated lands

2. Learning outcomes on the EP

Codes	Learning outcomes
LO1	Understand the importance of the principles and culture of academic integrity, legal norms in the field of natural science disciplines.
LO2	Demonstrate the safe conduct of hydrometric and hydrological works, hydrometric measurements at water sources using measuring instruments, making calculations, carrying out work on the composition and quality of water, carrying out engineering and survey work.
LO3	Apply the main factors of river flow formation, statistical methods for calculating the main characteristics of the annual flow and its intra-annual distribution.
LO4	To collect and interpret information for solving problems in the field of water resources and water use of the main types and laws of movement, regime and balance of groundwater, protection of groundwater, fundamentals of hydrogeology.
LO5	The use of their scientific articles in the field under study with the use of scientific research in the design of water management structures, a description of the scope of business correspondence.
LO6	Know and understand the use of the system of legal norms regulating the general provisions on the use, protection and restoration of water resources.
LO7	Apply methods of combating pollution of natural waters and monitoring the pollution of water bodies using geoinformation technologies.
LO8	To study the methods of assessing the current state of water resources, the principles of joint water resources management in the world practice with the use of theoretical and practical knowledge in the field of water resources management using the basin approach.
LO9	Distinguish between the designs, operating principles and scope of pumps of various types, evaluate their technical characteristics and operating modes.
LO10	To study the skills of teaching technologies for ensuring the long-term operation of water management facilities and to design hydraulic structures.
LO11	The ability to apply engineering equipment systems and methods of their organization.
LO12	To form the skills of effective management of water resources of rivers, taking into account the interests of all water users and water consumers.

3. Content of the educational program

№	CC/UC/OC	Code of discipline	Name of the discipline that forms the competence	in academic credits	Volume in hours							Distribution of credits by courses and semesters								Department	Form of control
					in academic hours	Auditorium				Extracurricular		1 course		2 course		3 course		4 course			
						Lectures	Practical classes	Laboratory research	Other (practice)	IWST	IWS	1	2	3	4	5	6	7	8		
GES		**General education subject cycle**		**56**	**1680**	**84**	**636**			**240**	**720**										
Module. Humanities and language				**30**	**900**	**30**	**270**			**150**	**450**										
1	CC	HK 1101	History of Kazakhstan (SE)	5	150	15	35			25	75		5							29	State examination
2	CC	Phil 2102	Philosophy	5	150	15	35			25	75			5						29	exam
3	CC	FL 1103	Foreign language	10	300		100			50	150	5	5							14	exam
4	CC	K(R)L 1104	Kazakh (Russian) language	10	300		100			50	150	5	5							15	exam
Module. Professional and communicative				**10**	**300**	**30**	**70**			**50**	**150**										
5	CC	ICT 2105	Information and Communication Technologies	5	150	15	35			25	75				5					9	exam
6	OC	LACC 1108	Law and anti-corruption culture	5	150	15	35			25	75	5								3	exam
		Econ 1108	Economy																	2	
		Ecol 1108	Ecology																		
		LS 1108	Life safety																	176	
Module. Socio-political knowledge and a healthy lifestyle				**16**	**480**	**24**	**296**			**40**	**120**										
7	CC	SPKM (SPCP) 1106	Social and political knowledge module (Social Studies,Political Studies, Cultural Studies, Psychology)	8	240	24	56			40	120	8								29	exam
8	CC	PT 1107 2107	Physical Training	8	240		240					2	2	2	2					30	exam
CS and MS		**Core subjects cycle and Major subjects cycle**		**172**	**5160**	**438**	**766**	**256**	**260**	**730**	**2710**										

Module 1 General Technical basis of the specialist				**31**	**930**	**84**	**140**	**56**	**30**	**140**	**480**										
9	UC	Mat 1202	Mathematics	5	150	15	35			25	75		5							9	exam
10	UC	EG 1201	Engineering geodesy	5	150	15	35			25	75	5								11	exam
11	UC	EH 1203	Engineering hydrometry	5	150	15	15	20		25	75		5							4	exam
		TP 1204	Traning practice	3	90				30		60		3							4	Dif. credit
12	OC	TM 2205	Technical mechanics	5	150	15	15	20		25	75			5						7	exam
		EM 2205	Engineering mechanics																		
13	UC	DGEG 2206	Descriptive geometry and engineering graphics	4	120	12	28			20	60			4						7	exam
14	OC	Hyd 2207	Hydrochemistry	4	120	12	12	16		20	60			4						19	exam
		Chem 2207	Chemistry																		
Module 2 Physical interpretation of liquids				**28**	**840**	**63**	**63**	**84**	**70**	**105**	**455**										
15	UC	FGH 2208	Fundamentals of Geology and Hydrogeology	5	150	15	15	20		25	75			5						4	exam
16	UC	Phys 2210	Physics	5	150	15	15	20		25	75				5					9	exam
17	UC	Hyd 2212	Hydraulics	6	180	18	18	24		30	90				6					4	exam
18	UC	HFR 2211	Hydrology and flow regulation	5	150	15	15	20		25	75				5					4	exam
19	UC	PP 2213	Production practice	7	210				70		140				7					4	Dif. credit
Module 3 Legal regulation of water management design				**16**	**480**	**48**	**112**			**80**	**240**										
20	OC	WL 3219	Water law	5	150	15	35			25	75						5			3	exam
		EL 3219	Environmental law																		
21	OC	BE 3214	Business Ethics	5	150	15	35			25	75					5				2	exam
		BC 3214	Business correspondence																		
22	OC	CADSWMF 3215	Computer-aided design system for water management facilities	6	180	18	42			30	90					6				4	exam
		DEHS 3215	Design of elements of hydraulic structures																		
Module 4 Water resources monitoring and water treatment technology				**18**	**540**	**54**	**82**	**44**		**90**	**270**										
23	OC	CM 2209	Climatology and meteorology	5	150	15	15	20		25	75			5						4	exam
		EB 2209	Ecological bioclimatology																		
24	OC	WTT 4220	Water treatment technology	6	180	18	18	24		30	90							6		4	exam

		NWWT 4220	Natural and waste water treatment																		
25	OC	GIS-TWI 3217	GIS-technology in the water industry	7	210	21	49			35	105						7			4	exam
		ITMWB 3217	Information technologies and monitoring of water bodies																		
Module 5 Ensuring safety in the design and operation of water management facilities				**30**	**900**	**90**	**162**	**48**		**150**	**450**										
26	OC	PPS 3216	Pumps and pumping stations	6	180	18	18	24		30	90					6				4	exam
		HP 3216	Hydropower plants																		
27	UC	IUWR 3301	Integrated use of water resources	7	210	21	49			35	105					7				4	exam
28	UC	HS 4305	Hydrotechnical structures	6	180	18	18	24		30	90							6		4	exam
29	OC	WIW 4307	Water intake waterworks	5	150	15	35			25	75							5		4	exam
		RSHS 4307	Reliability and safety of hydraulic structures																		
30	OC	OAWMSS 4306	Operation and automation of water management systems and structures	6	180	18	42			30	90							6		4	exam
		WMSWU 4306	Water management systems and water use																		
Module 6 Organization of construction of water management systems and structures				**20**	**600**	**60**	**140**			**100**	**300**										
31	OC	ES 3303	Engineering structures	5	150	15	35			25	75						5			4	exam
		WMC 3303	Water management construction																		
32	OC	HVGIBWMS 4309	Heating, ventilation and gas installations of buildings of water management systems	5	150	15	35			25	75								5	4	exam
		STEB 4309	Sanitary-technical equipment of buildings																		
33	UC	BF 3302	Bases and foundations	5	150	15	35			25	75						5			4	exam
34	OC	OTWMS 4308	Organization and technology of water management structures	5	150	15	35			25	75								5	4	exam
		ATPAWSIP 4308	Organization and technology of production of agricultural																		

			water supply and irrigation of pastures																		
Module 7 Water resource management in practice				**29**	**870**	**39**	**67**	**24**	**160**	**65**	**515**										
35	UC	MWSSS 3218	Management of water supply and sanitation systems	6	180	18	18	24		30	90					6				4	exam
36	OC	WRM 4221	Water resources management	7	210	21	49			35	105							7		4	exam
		WC 4221	Water cadastre																		
37	UC	PP 3304	Production practice	8	240				80		160						8			4	Dif. credit
		PP 4310	Production practice	4	120				40		80								4	4	Dif. credit
		PP 4311	Pregraduation practice	4	120				40		80								4	4	Dif. credit
Final module				**12**	**360**				**120**		**240**										
38		Final certification		12	360				120		240								12	4	
		Total		**240**	**7200**	**522**	**1402**	**256**	**380**	**970**	**3670**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**		

[1]Note:

Department number	ABBR	The name of the department
1	AAF	Accounting, audit and finance
2	MaOA	Management and organization of agribusiness named after Kh.D. Churin
3	Right	Right
4	WRlR	Water resources and land reclamation
5	MU	Machine usage
6	PT	Professional training
7	MaCAM	Mechanics and construction of agricultural machinery"
8	ATT	Agrarian technology and technology
9	ITA	IT-tehnologiyalar zhane avtomtandyru
10	ESaA	Energy Saving and Automation
11	LRaC	Land Resources and Cadastre
12	FRaH	Forest resources and hunting
13	PPaQ	Plant Protection and Quarantine
14	FL	Foreign languages
15	KaRL	Kazakh and Russian languages
16	SsaA	Soil science and agrochemistry
17	EC	Ecology
18	HaWG	Fruit and vegetable growing and nut growing
19	AG	Agronomy
20	BS	Biological safety
21	CVM	Clinical Veterinary Medicine
22	OSaBR	Obstetrics, surgery and animal reproduction biotechnology
23	MVaI	Microbiology, Virology and Immunology
24	VsEaH	Veterinary and sanitary examination and hygiene
25	FTaS	Technology and food safety
26	BPfaF	Beekeeping, poultry farming and fisheries
27	IAAR	Technology of production of livestock products
28	PMaBnAB	"Physiology, morphology and biochemistry" named after N.O. Bazanova
29	HKaCNK	History of Kazakhstan and culture of the peoples of Kazakhstan
30	PEaS	Physical education and sport
31	MD	Military Department
32	GBaB	Genetics, breeding and biotechnology

4 Competence map of modules

General education competencies		Learning outcome
MC 1	They are aimed at forming the worldview, civil and moral positions of a future specialist who is competitive on the basis of knowledge of information and communication technologies, building communication programs in the state, Russian and foreign languages, focusing on a healthy lifestyle, self-improvement and professional success;	LO1- Understand the importance of the principles and culture of academic integrity, legal norms in the field of natural science disciplines.
MC2	form a system of General competencies that ensure the socio-cultural development of the future specialist's personality based on the formation of his worldview, civil and moral positions;	
MC 3	Develop the ability to interpersonal social and professional communication in the state, Russian and foreign languages;	
MC4	Contribute to the development of information literacy through the acquisition and use of modern information and communication technologies in all areas of their lives and activities;	
MC 5	Form skills of self-development and education throughout life;	
MC6	They form a person capable of mobility in the modern world, critical thinking and physical self-improvement.	
Basic competencies		**Learning outcome**
MC 7	Module 1 General Technical basis of the specialist Forms fundamental knowledge of natural Sciences	LO2- Demonstrate the safe conduct of hydrometric and hydrological works, hydrometric measurements at water sources using measuring instruments, making calculations, carrying out work on the composition and quality of water, carrying out engineering and survey work.
MC 8	Module 2-Physical interpretation of liquids Forms basic knowledge of physical properties of liquids and dynamics of underground water	LO3- Apply the main factors of river flow formation, statistical methods for calculating the main characteristics of the annual flow and its intra-annual distribution; LO4-To collect and interpret information for solving problems in the field of water resources and water use of the main types and laws of movement, regime and balance of groundwater, protection of groundwater, fundamentals of

		hydrogeology
MC 9	Module 3- Legal regulation of water management design Creates engineering and legal competence of the specialist	LO5- The use of their scientific articles in the field under study with the use of scientific research in the design of water management structures, a description of the scope of business correspondence; LO6- Know and understand the use of the system of legal norms regulating the general provisions on the use, protection and restoration of water resources
MC10	Module 4- Water resources monitoring and water treatment technology Monitoring of water bodies and organization of technical and material support for the operation of water treatment plants, water pumping stations and wastewater treatment facilities	LO7- Apply methods of combating pollution of natural waters and monitoring the pollution of water bodies using geoinformation technologies
Professional competencies		**Learning outcome**
MC11	Module 5- Ensuring safety in the design and operation of water management facilities Management of the operation of a water treatment plant, water pumping station, and wastewater treatment equipment.	LO8-To study the methods of assessing the current state of water resources, the principles of joint water resources management in the world practice with the use of theoretical and practical knowledge in the field of water resources management using the basin approach; LO9- Distinguish between the designs, operating principles and scope of pumps of various types, evaluate their technical characteristics and operating modes
MC12	Module 6- Organization of construction of water management systems and structures Organization of works to ensure the safety of reclamation systems and environmental protection measures	LO10- To study the skills of teaching technologies for ensuring the long-term operation of water management facilities and to design hydraulic structures; LO11- The ability to apply engineering equipment systems and methods of their organization
MC13	Module 7- Water resource management in practice Organization and planning of water resources management activities in production conditions	LO12- To form the skills of effective management of water resources of rivers, taking into account the interests of all water users and water consumers

5. A summary table reflecting the amount of credits mastered by the modules of the educational program:
Number of modules -7

Course of study	Semester	The number of studied disciplines			Number of credits						Total hours	Military training	Number	
		CC	UC	OC	theoretical education	Physical Training	Productional Practice	Pregraduation practice	Final assessment	Total			Exam	Diff. credit
1	1	4	1	1	30	-				30	900		6	
	2	4	2	-	27	3				30	900		6	1
2	3	2	2	3	30					30	900		7	
	4	2	2	1	23		7			30	900		5	1
3	5	-	2	3	30					30	900		5	
	6	-	2	2	22		8			30	900		4	1
4	7	-	1	4	30					30	900		5	
	8	-	-	2	10		4	4	12	30	900		2	2
Total		**12**	**12**	**16**	**202**	**3**	**19**	**4**	**12**	**240**	**7200**	**588**	**40**	**5**

Annex to EP

Annex 1

Information about disciplines

№	Name of the discipline	Brief description of the discipline (30-50 words)	Number of credits	Emerging competencies
General education subjects cycle /Core component				
1.	History of Kazakhstan	The course aims at formation at students of modern conceptions of history based on a holistic and objective coverage of the problems of ethnogenesis of the Kazakh people, the evolution of forms of statehood and civilization in the territory of the great steppe and the aggregate of the most important historical facts and events.	5	MC1
2.	Philosophy	The course is aimed at forming students ' understanding of philosophy as a special form of knowledge of the world, its main sections, problems and methods, as well as skills of self-analysis and moral self-regulation, the development of research abilities and the formation of intellectual and creative potential.	5	MC1
3.	Foreign language	Teaching a foreign language sets goals for the development of foreign language communicative competence in the totality of its components	10	MC1
4.	Kazakh (Russian) language	The discipline is designed for the development of the language personality of the student, who is able to carry out cognitive and communicative activities in Russian in the areas of interpersonal, social, professional, and intercultural communication in the context of the implementation of state programs of trilingualism and spiritual modernization of national consciousness.	10	MC1
5.	Information and Communication Technologies (in English)	Formation of the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, ways of collecting and transmitting information through digital technologies.	5	MC1
6.	**Social and political knowledge module(Social Studies, Political Studies, Cultural Studies Psychology)**			
	Social Studies	Object and subject of sociology. The main stages and directions of development of sociological thought. The social structure of society. Stratification models of social inequality. Personality as an object and subject of social development. Sociology of work. Sociology of religion. Problems of employment and its regulation. Sociology of family and marriage. Methodology, methods and techniques of sociological research.	2	MC1
	Political Studies	Political science as a science of politics: subject, method, history of formation. Power, domination,	2	

		legality. Political elites and political leadership. The political system of society. Political regime. Civil society. Political culture of the society. Political development in the context of modernization theory. Political ideologies. Political problems of sovereign Kazakhstan. World politics and international relations.		
	Cultural Studies	Theoretical and conceptual founda-tions of cultural studies. Object and subject of cultural studies. The main stages of cultural development. Primitive culture is the cradle of culture. Ancient culture-the beginning of classical culture. The middle ages-features of Western European culture and the culture of the Arab Caliphate. The Era Of The Italian Renaissance. Humanism and the age of Enlightenment.	2	
	Psychology	History of origin and development of psychological science. Branches of psychology. The general concept of the psyche. Methods of psychology research. Personality and activity. Informative psychic processes. Individual-psychological and emotional-volunteer features of personality. Temperament. Character. Ability. Emotions and feelings. Desire.	2	
7.	Physical Training	The discipline covers a range of issues related to physical culture as part of universal culture, a healthy lifestyle, its main components, the socio-biological basis of adaptation of the human body to physical and mental activity, preparation for independent physical culture and sports, age-related physiology	8	MC1
General education subjects cycle/ Optional component				
8.	Law and anti-corruption culture	The course will allow to learn the concepts and content of law and professional ethics in legal activities, possible ways to resolve moral conflict situations in the professional activity of a lawyer; to be able to assess the facts and phenomena of professional activity from an ethical point of view, to apply moral rules and norms of behavior in specific situations	5	MC6 LO1 LO5
9.	Economy	Social science that studies the needs of people. It analyzes how society uses and spends resources on its needs to ensure the quality of life		MC6 LO1 LO5
10.	Ecology	It gives theoretical knowledge in the field of ecology, promotes environmental literacy of students, forms ecological thinking, as well as the ability to apply this knowledge in professional and other activities.		MC6 LO1 LO5
11.	Life safety	The discipline is aimed at fostering safe thinking, a safe type of person and gaining knowledge about dangerous and emergency situations of natural, man-made and social origin; organization of the protection of the population and territories; legal regulatory, technical and organizational foundations of life safety.		MC6 LO1 LO5
Core subjects cycle / University component				
12.	Mathematics	Study of fundamental concepts, laws and theory of classical mathematics. Ability to build mathematical models, set mathematical problems and select	5	MC7 LO2 LO3

		appropriate mathematical methods and algorithms for solving the problem. The formation of a scientific Outlook and logical thinking. Conducting qualitative mathematical research, based on the mathematical analysis to develop practical recommendations		
13.	Engineering geodesy	A science that studies the shape and size of the Earth's surface or its individual sections by measuring and computing them, building plans, maps, and profiles that are used in solving engineering, economic, and other problems. Geodesy is of great importance in conducting the state land cadastre, to provide information about land in order to organize its rational use and protection, regulation of land relations, land management, justification of the amount of payment for land, assessment of economic activity.	5	MC7 LO2 LO3
14.	Engineering hydrometry	Modern instruments and hydrometric units are described. New aspects of river hydrometry and hydrology related to the current system of state water accounting and water cadastre maintenance are described. Various options for regulating flow and its economic efficiency are highlighted. The complex of scientific, methodical and technical measures on metrological support of the hydrological network is considered.	5	MC7 LO2 LO3
15.	Descriptive geometry and engineering graphics	Design of drawings. Practical application of geometric constructions. Rectangular and axonometrical protezirovanie. Sections and sections. Working drawings of parts. Assembly drawing. Circuitry. Construction and architectural drawings.	4	MC7 LO2 LO4
16.	Fundamentals of Geology and Hydrogeology	Structure, state of the Earth"s crust, materials of the Earth"s crust, mineral and petrographic composition and properties, endogenous geological processes, exogenous geological processes, geochronology, stratigraphy, minerals, rocks, types of water in rocks and minerals, properties of each type, gravitational properties of groundwater, movement of groundwater, infiltration and filtration, basic types and laws of movement, regime and balance of groundwater, protection of groundwater, fundamentals of engineering geology.	5	MC8 LO3 LO4
17.	Physics	Formation of an in-depth understanding of the structure of matter, the nature of phenomena occurring in it, which determines the development of natural science and scientific and technical progress. Connection of physics with other natural Sciences and related disciplines. The role of physics in the creation and development of new branches of engineering and new technologies. Influence of technology on the development of physics. Methods of physical research: experience, hypothesis, experiment, theory.	5	MC8 LO3 LO4
18.	Hydraulics	The course covers the issues of hydrostatics and hydrodynamics, the practical application of the laws of hydraulics, in addition, laboratory classes are provided	8	MC8 LO3 LO4

		for the successful study of the discipline, during which the student gets the opportunity to observe all the phenomena that occur.		
19.	Hydrology and flow regulation	Hydrology – knowledge about the factors and patterns of river flow formation. Modes of rivers, lakes, swamps, methods and technical means of measuring and determining the main hydrological characteristics of watercourses and reservoirs. Theoretical foundations and methods of engineering hydrological and water management calculations.	5	MC9 LO3 LO4
20.	Management of water supply and sanitation systems	Management of water supply and sanitation systems-knowledge of the rules for using water supply and sanitation systems, licensing of activities for the operation of engineering systems, organization of dispatching services, reliability of water supply and sanitation systems.	6	MC11 LO6 LO8 LO12
Core subjects cycle / Optional component				
21.	Technical mechanics	Basic concepts and axioms of mechanics; methods for converting systems of forces. Conditions for the equilibrium of solids under the action of forces. Methods for specifying the movement of a point, determining its speed and acceleration. Translational, rotational and plane motion of a body, complex movement of a point.	5	MC7 LO2 LO4
22.	Engineering mechanics	The discipline is aimed at preparing a specialist to study and master the basic methods and laws of mechanics that contribute to the formation of a modern natural science worldview, developing and organizing scientific and technical thinking.		MC7 LO2 LO4
23.	Hydrochemistry	Basic concepts and laws of chemistry. The composition of natural waters and its determining factors. Classification of the composition of natural waters. General patterns of formation of the chemical composition of natural waters.	4	MC7 LO2 LO7
24.	Chemistry	Processes of water metamorphization. Sources of formation of organic matter, biogenic and microelements in natural waters.		MC7 LO2 LO7
25.	Water law	The system of legal norms regulating public relations on the use, protection and restoration of water bodies.	5	MC9 LO5 LO6
26.	Environmental law	A set of legal norms regulating social relations in the sphere of interaction between society and nature.		MC9 LO5 LO6
27.	Business Ethics	Studying the discipline will allow the student to: master the basic knowledge of ethical standards in the field of business relations, to form the students ' concepts of ethics of official behavior and actions of the manager, implement knowledge about the values and norms of business ethics in specific practical activities, solve ethical problems of business life and bear moral responsibility for them.	5	MC9 LO5 LO6
28.	Business correspondence	General requirements and features of business correspondence. Business letter in Kazakhstan. Legislative and regulatory-methodological bases of		MC9 LO5 LO6

		correspondence in Kazakhstan. The role and significance of academic writing. Academic text: the main genres, techniques and structure. Rules for the design of a business letter. Business letter forms. Letters on general issues. The structure of a business letter. Informative and convincing business letter. Types of writing. The specifics of written genres. The system of organizational and distribution documentation. Types and features of foreign trade partners. Business etiquette and protocols.		
29.	Computer-aided design system for water management facilities	Familiarization with the latest achievements of science and technology in the field of automation of design of hydraulic structures, the main ideas and principles of their use.	5	MC9 LO5 LO6
30.	Design of elements of hydraulic structures	Research of a widespread program in the field of computer-aided design systems design. Mastering the graphical capabilities of these tools in terms of automating the stages of conceptual, technical and detailed design. Disciplinary research contributes to the training of highly qualified hydraulic engineers with knowledge and skills in working with powerful means of expanding intellectual capabilities in the design of engineering structures.		MC9 LO5 LO6
31.	Climatology and meteorology	The discipline studies the composition, structure and processes occurring in the atmosphere, factors and processes of climate formation, causes of climate change, principles and classifications of climate, Earth's climate.	5	MC10 LO2 LO7
32.	Ecological bioclimatology	The discipline studies climate as the most important environmental factor of the environment. Ecological features of the atmosphere as a habitat. The role of the climate regime in the formation of the ecological state, monitoring of changes in the ecological and climatic state, anthropogenic impact and ways to overcome environmental crises associated with climate change and atmospheric pollution.		MC10 LO2 LO7
33.	Water treatment technology	Water treatment technology-knowledge with the technology of natural and waste water treatment and their facilities. Study of the state of the theory and practice of water treatment, as well as methods of natural and wastewater treatment of cities and settlements.	7	MC11 LO8 LO9
34.	Natural and waste water treatment	Studies methods of natural and waste water treatment by coagulation, sedimentation, filtration, and water disinfection. The special treatment of the water. Technological scheme of structures. Calculation of the reagent economy. Hydraulic calculation of structures for clarification.		MC11 LO8 LO9
35.	GIS technologies in water	The discipline studies the basic concepts in geoinformation systems (GIS), structure, functionality, tools and basic GIS packages, as well as the	5	MC10 LO7 LO8

	management	application of GIS in water management.		
36.	Information technologies and monitoring of water bodies	Possession of basic knowledge in the field of information processing and data analysis on water resources, cartography and methods of General mapping, compilation of water and man-made maps, collection, processing, systematization, analysis of information, database formation.		MC10 LO7 LO8
37.	Pumps and pumping stations	Designs, operating principle and applications of pumps of various types. Their technical characteristics and operating modes are considered. Recommendations are given for determining the operating parameters of general-purpose pumps, as well as pumps used in production.	8	MC10 LO2 LO7
38.	Hydropower plants	Theoretical information about the designs and the principle of operation of hydraulic turbines, the method and features of their installation, as well as information about the structural elements of the water path of turbines.		MC10 LO2 LO7
39.	Water resourses management	The discipline examines the current state of water resources management in the context of sustainable development, the concept of integrated water resources management, the rationale for the need to implement integrated water resources management for the conditions of Kazakhstan, the legislative framework for water resources management, the national water policy and the national water resources management strategy, the main strategic principle of integrated water resources management, the functioning of basin councils, information support of the integrated water resources management process, international cooperation and improvement of the management of transboundary water bodies.	7	MC11 LO6 LO8 LO12
40.	Water cadastre	The discipline is intended for a systematic set of documented information about water bodies owned by the state, the property of the subjects of the Republic of Kazakhstan, municipalities, individuals and legal entities and individual entrepreneurs, the use of water bodies, river basins and basin districts		MC11 LO6 LO8 LO12
Major subjects cycle / University component				
41.	Integrated use of water resources	Rational use of water resources of rivers, taking into account the interests of all water users and consumers, establishing their private and total water consumption and matching water consumption with the water content of the used watercourses.	7	MC11 LO8 LO9
42.	Hydrotechnical structures	Formation of professional skills for the design and calculation of Hydraulic structures on the water management network, to give skills for modeling and construction and operation of water intake structures and reservoir waterworks. Own the problem of water resources management, especially on transboundary watercourses, the problem of integrated water resources management.	6	MC11 LO8 LO9

43.	Bases and foundations	The choice of a rational type of foundations with engineering and geological conditions of soil occurrence under the construction under construction and with the purpose and design of the entire structure as a whole.	5	MC12 LO10 LO11
Major subjects cycle/ Optional component				
44.	Water intake waterworks	General information about water intake waterworks. Classification of water intake waterworks. Requirements for water intake hydraulic units. River damless water intakes. River dam water intakes. General information. Side water intakes. Frontal water intakes. Bottom-lattice water intakes. Water intake waterworks on rivers	5	MC11 LO8 LO9
45.	Reliability and safety of hydraulic structures	Water filtration in the area of hydraulic structures. Stability and strength of water support structures. Dams: ground, concrete, reinforced concrete, wooden. Culverts at dams: spillways, water outlets, water outlets. Valves and hydro-mechanical equipment of hydraulic structures. Layouts of river waterworks. Special structures of waterworks and power facilities: fish - passing, fish-protection, shugo-and ice-passing, forest-passing, anti-erosion, anti-settlement.		MC11 LO8 LO9
46.	Operation and automation of water management systems and structures	Issues of water use planning, organization of service for the operation of irrigation systems and water use in irrigation systems, measures to ensure reliable and long-term operation of systems.	7	MC11 LO8 LO9
47.	Water management systems and water use	Study and solution of problems of operation of water management facilities. About the types of operational work. About the resources and methods of performing these works in accordance with modern requirements, improving their efficiency, efficiency and quality. About environmental protection measures during the operation of systems, structures and objects.		MC11 LO8 LO9
48.	Engineering structures	New and improved building materials and structures. Conditions for their application. The study of this discipline allows you to design the properties of the main building materials, to study the main properties of building materials and to solve practical problems on the selection, calculation and application of building materials and structures in the structures of hydraulic reclamation systems.	5	MC12 LO10 LO11
49.	Water management construction	General information and features of building materials and construction. Raw materials and manufacturing. The use of the obtained materials and structures in the construction of water management systems, depending on their properties. New and improved building materials and structures. Conditions for their application. The study of this discipline allows you to design the properties of the main building materials, to		MC12 LO10 LO11

		study the main properties of building materials and to solve practical problems on the selection, calculation and application of building materials and structures in the structures of hydraulic reclamation systems.		
50.	Heating, ventilating and gas installations of buildings of water-economic systems	Climatic effects. Thermal and thermophysical properties of enclosing structures. The processes of heat and moisture exchange indoors. Building engineering systems and methods for their regulation. The main harmful emissions, their quantity, the temperature of the internal air.	5	MC12 LO10 LO11
51.	Sanitary-technical equipment of buildings	For sanitary and technical equipment of residential, public, industrial and agricultural buildings. Internal systems of water supply, drainage (Sewerage) and gas supply are considered.		MC12 LO10 LO11
52.	Organization and technology of water management structures	Familiarization of the future graduate with the main components and provisions of the construction business and teach him to competently design, build and operate technically appropriate and progressive objects of water management construction in various engineering and geological conditions, using modern means of mechanization and technology of water management works.	5	MC12 LO10 LO11
53.	Organization and technology of production of agricultural water supply and irrigation of pastures	knowledge of the rules for using water supply and sanitation systems, licensing of activities for the operation of engineering systems, organization of dispatching services, reliability of water supply and sanitation systems.		MC12 LO10 LO11

Application 2

Practice bases

№	Name of companies, enterprises, organizations	Contacts Tel, e-mail
1	LLP "Institute of Geography"	Almaty, Kabanbai Batyr/Pushkina 67/99
2	GU "Kazselezashchita" of the Ministry of Emergency Situations of the Republic of Kazakhstan	Almaty, Kaldayakov str., 70, +7(727) 2912755
3	D. Kunaev TANK RSE "Kazvodkhoz"	Almaty region, ul. Melioratornaya, 1A 8 (72737) 1 80 00
4	Design Institute of PC "Kazgiprovodkhoz"	Almaty, 434 Seifullin Ave., 8 (727) 2793522
5	GKP "Almaty Su"	Almaty, 196 Zharokov str., 8 (727)2276001
6	Branch of RSE on PVC "Kazhydromet" Ministry of Energy of the Republic of Kazakhstan	Almaty, 32 Abay Ave. 8 (727)2676464
7	East Kazakhstan branch of RSE "Kazvodkhoz"	Ust-Kamenogorsk, Kazakhstan str., 99/1
8	Kyzylorda branch of RSE "Kazvodkhoz" KVR MAGiPR RK	Kyzylorda, Tole bi str., 66, 8 (7242) 233250
9	Zhambyl branch of RSE "Kazvodkhoz" KVR of the Ministry of Agriculture of the Republic of Kazakhstan	Zhambyl region, Taraz, Zhaugash Batyr str., 1a, 8 (7262) 425490
10	Turkestan branch of RSE "Kazvodkhoz" KVR MAGiPR RK	Shymkent, Mukhamed Haidar Dulati str., 5 8 (7252) 54 87 37
11	RSU Aralo-Syrdarya BVI KVR MAGiPR RK	Kyzylorda, Amangeldy str., 107, 8 (7242)235607
12	Balkhash-Alakol BVI KVR MAGiPR RK	Almaty, Abylai Khan Ave., 2, 8 (7272)453253
13	MAEKKazatomprom LLP	West Kazakhstan region, Mangystau region, Aktau 8 (7292)564208
14	" Zonal hydrogeological and reclamation center»	Almaty, Zhetysu district, 113 Baisheva Street 8 (727) 264 26 29
15	State enterprise " Kostanay Su»	Kostanay region, Kostanay, Abay street 19 8(7142)222500
16	LLP "Design Institute named after Zh. R. Dzhanekenov"	Almaty region, Taldykorgan, D. Konaev str., 20
17	LLP "Water resources-Marketing"	Shymkent, G. Ormanov str., 17, 8 (7252) 321 195
18	Panfilov production site of the Almaty branch of the RSE "Kazvodkhoz" KVR MAGiPR RK	Almaty region, Zharkent, Golovatskogo str., 290, 8 (72831) 9 40 12
19	RSE " Kazvodkhoz»KVR MAGiPR RK	Nur-Sultan, Pushkin street, 25, 8 (7172) 24 85 26
20	SCC " Taza Su-2014»	Zhambyl region, T. Ryskulov district, Kulan village, K. Asylov str., 54
21	GKP " Alakolirrigation»	Almaty region, Alakol district, Usharal, V. Toshchenko str., 19, 8 (72833) 3 52 71
22	GKP "Turkestan-Su"	Turkestan region, Turkestan, S. Erubayev str., 255, 8 (72533) 4 21 92
23	Kegens district " Department of Housing and Communal Services and housing Inspection»	Almaty region, Kegen region, Kegen village, B. Momyshuly str., 9, 8 (7277) 721475
24	KGP "Ayagoz Su"	East Kazakhstan region, Ayagoz, 61 Barak batyr str., 8(7223)730301
25	«Uralvodproekt» LLP	WKO, Uralsk, ul. Hamid Churin, 119, 8 (7252) 535057
26	Kyzylorda branch of RSE “Kazalysushar»	Kyzylorda region, Kazalinsky district, Aiteke bi str., 1, 8 (724) 3851687
27	GKP " Kapshagai Su Arnasy»	Almaty region, Kapchagai, Koichumanov street, 4, 8 (72772) 4 19 48
28	KGP "Balkhash Su»	Karaganda region, Balkhash, Sabitova MKR, 18b, 8 (71036) 65490