Non-Commercial Joint-Stock Company
«Kazakh National Agrarian Research University»

AGREED
Head of the Big Almaty Channel
named after D.Kunaeva
_____ M.Arystanov
«05» 04 2023

AGREED
Head RSI "Zonal hydrogeological-
meliorative center"
_____ Zh.Yerikuly
«05» 04 2023

APPROVED
Chairman of the Board-Rector
_____ A.Kurishbaev
«__» _____ 2023

EDUCATIONAL PROGRAM

6B08602 – «Melioration, Recultivation and Land Protection»

Awarded degree: Bachelor of Agriculture under the Educational Programme
«6B08602 – Melioration, Recultivation and Land Protection»

Almaty 2023

Approved at the meeting of the Department «Water resources and melioration»
Protocol №1, «20» 08 2023 y.
Head of the department _____ Ye.Zhaparkulova

Considered at meetings Academic Committee of the Faculty
of «Water, Land and Forest Resources»
Protocol № 1 «25» 08 2023 y.
Chairman of the AC of the faculty _____ L.Makhmudova

Reviewed by the Educational Methodological Council of the University and recommended to the Academic Council
Protocol № 1 « 28 » 08 2023 y.
Chairman of the EMC of the University _____ K.Kaiyrbaeva

The educational program was approved at the meeting of the Academic Council of KazNARU
Protocol № 11, «05» 04 2023 y.

Developers:

Dean of the faculty	T.Kerteshev
Head of the department	Y.Zhaparkulova
PhD., assos.professor	K.Anuarbekov
Graduate 2022	L. Chaimerden
Student of group MR 20-16K	T.Kydyrkul

Employers:

Head of the Big Almaty Channel named after D.Kunaeva	M.Arystanov
Head RSI "Zonal hydrogeological-meliorative center"	Zh.Yerikuly

Agreed:

Head of training Department	A. Koyshibayev
Head of the Educational Programs Design Department	Zh. Kussainova

Field of application

It is intended for realization of preparation of bachelors under the educational program «6B08602 – Melioration, recultivation and land protection» in NCJSC «Kazakh National Agrarian Research University».

Regulations

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

State obligatory standard for higher education. Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 № 604;

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. 73 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 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	6B08602 – Melioration, recultivation and land protection
Type of educational program	Acting
The purpose of the educational program	Training of highly qualified specialists in design, construction and operation of meliorative and water management facilities, recultivation and land protection for agro-industrial complex.
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 March 27, 2019 №009
Accreditation of EP The name of the accreditation body The period of validity of accreditation	Certificate No. AB0763 Independent accreditation and rating agency 24.12.2015 - 23.12.2020 Certificate No. RSB-A 595/2018 NKAOKA.KZ
Awarded degree	Bachelor of agriculture on the educational program «6B08602 – Melioration, recultivation and land protection
Learning outcomes	Table 2
List of qualifications and positions	1. Inspector of hydraulic structures 2. Technician-hydromeliorator 3. Melioration engineer
Professional field of activity	Development of a plan for the rational use of land melioration, maintenance of the state monitoring of surface and water bodies and underground water resources, the protection and recultivation of lands disturbed or contaminated in the process of environmental management, environmental planning, maintenance and operation of water management systems and structures, construction and reconstruction of irrigation and watering systems security water facilities, organization of repair and restoration of especially emergency sections of inter-farm channels and hydro-melioration structures, control of operation of melioration machines and watering technique
Field and object of professional activity	• natural and technogenic complexes; • disturbed land; • surface and underground water resources; • irrigation and drainage systems of irrigated lands; • hydrotechnic structures; • design, survey, research and development organizations;
Functions of professional activity	• design, construction and operation of water management systems and structures; • maintenance of the state monitoring of surface water objects, state account of water and their use; • design of irrigation and drainage systems, monitoring and assessment of the hydro-melioration

	condition of irrigated lands; • rational use of natural resources on reclaimed lands; • organization and management of project, water, hydroelectric, agricultural, municipal organizations and enterprises; • performing research work in educational institutions and research centers of water, agriculture and energy sector; • expertise, 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 water and its use; 2. Calculation of irrigation and watering rates, irrigation regimes and watering techniques for agricultural crops. **2. Constructive:** 1. Design, construction and operation of melioration systems and structures; 2. Recultivation and land protection. **3. Information-technological:** 1. Development of measures for water users to preserve and improve the state of water and land resources; 2. Drawing up a plan for the rational use of reclaimed land and water bodies.
Be competent	- in monitoring and cadastre of water and land resources, supervision and control over rational use of melioration systems; - in questions of search of optimum constructive decisions at designing of hydraulic engineering constructions and their elements; - in application of methods of calculation of constructions on safety and reliability; - in the operation of irrigation machines and mechanisms used in water management construction; - in observing environmental principles of nature protection and environmental management.

2. Learning outcomes on EP

Codes	Learning outcomes
LO1	Determine the main principles of academic integrity, ethical and legal norms in the field of natural science disciplines.
LO2	Carry out the collection and information to form environmental processes and phenomena, the basis of physical self-improvement, economic, environmental laws and scientific considerations.
LO3	Demonstrate basic knowledge and concepts of mathematical analysis, methods of experimental research of hydrochemistry and technical mechanics using computers and software.
LO4	Give examples of topographic surveys, information processing of design work and tasks on descriptive geometry and engineering graphics.
LO5	Apply knowledge and understanding of the facts of hydraulic calculations for the search and exploration of underground water using modern computer programs (AutoCAD, GIS, etc.) in the field of study.
LO6	Know the methods of scientific research and production technology in agriculture and irrigation works using land reclamation construction machines and structures.
LO7	Evaluate soil and climatic factors, basics of geology and hydrogeology, hydrology and flow regulation and hydrometric work.
LO8	Characterize irrigation reclamation, environmental safety of land reclamation and reclamation works to protect land of different purposes.
LO9	Conduct an experiment applying theoretical and practical knowledge of the design and operation of pumping stations, hydraulic power plants and organization of hydromelioration works.
LO10	Argue the design calculations of hydraulic structures, agricultural water supply and pasture watering and reclamation systems.
LO11	Recommend a plan for the automation and operation of reclamation systems, management of natural-technogenic complexes and reclamation engineering structures.
LO12	Develop systems to solve major problems of land reclamation and protection, environmental justification of engineering solutions in land reclamation.
LO13	Plan the rational use and management of land and water resources, environmental management and natural resource management, and landscape science.
LO14	Release the acquired knowledge and skills in management activities.

3. Content of the educational program

№	OC/UC/OC	Code of discipline	Name of the discipline that forms the competence	in academic credits	Volume in hours							Distribution of credits by course and semester								Department[1]	Form of control
					n academic hours	Auditorium				Out-auditorium		1 course		2 course		3 course		4 course			
						Lectures	Practical classes	Lab classes	Other (practice	IWST	IWS	1	2	3	4	5	6	7	8		
	ЖБП/ООД/ GES	**Жалпы білім беретін пәндер циклі/ Цикл общеобразовательные дисциплины/General education subjects cycle**		**56**	**1680**	**84**	**636**			**240**	**720**	**25**	**12**	**12**	**7**						
Модуль. Гуманитарлық және тілдік/Гуманитарный и языковой/Humanities and language				**30**	**900**	**30**	**270**			**150**	**450**	**15**	**10**	**5**							
1	ОК	КТ/ІК/НК 1101	Қазақстан тарихы/История Казахстана/History of Kazakhstan	5	150	15	35			25	75	5								29	Мемлекеттік емтихан
2	ОК	Fil/Fil/Phil 2102	Философия/Философия/ Philosophy	5	150	15	35			25	75			5						29	Емтихан
3	ОК	ShT/IYa/ FL 1103	Шетел тілі/Иностранный язык/Foreign Language	10	300		100			50	150	5	5							14	Емтихан
4	ОК	K(O)T/ K(R)Ya/ K(R) L 1104	Қазақ (Орыс) тілі/Казахский (Русский) язык/Kazakh (Russian) Language	10	300		100			50	150	5	5							15	Емтихан
Модуль. Кәсіби және коммуникативті модулі/ Профессионально-коммуникативный/Professional and communicative				**10**	**300**	**30**	**70**			**50**	**150**			**5**	**5**						
5	ОК	АКТ/ІКТ/ІСТ 2105	Ақпараттық-коммуникациялық технологиялар/Информационно - коммуникационные технологии/Information and Communication Technologies	5	150	15	35			25	75			5						9	Емтихан
6	КВ	KSZhKM/ PAK/ LACC 2108	Құқық және сыбайлас жемқорлыққа қарсы мәдениет/ Право и антикоррупционная культура/	5	150	15	35			25	75				5					2	Емтихан

			Law and anti-corruption culture																		
		Eko/ Eco 2108	Экономика/Экономика/ Economics																	3	
		Ekol/ Ecol 2108	Экология/Экология/Ecology																		
		TAK/ BZh/ LS 2108	Тіршілік әрекетінің қауіпсіздігі/ Безопасность жизнедеятельности/ Life Safety																		
		Kas\Pre\ Ent 2108	Кәсіпкерлік/ Предпринимательство/ Entrepreneurship																		
		GZN/ONI/ FSR 2108	Ғылыми зерттеулердің негіздері/ Основы научных исследований/ Fundamentals of Scientific Research																		
Модуль. Әлеуметтік-саясаттану білім және салауатты өмір салты модулі/Социально-политических знаний и здоровый образ жизни/Socio-political knowledge and a healthy lifestyle				**16**	**480**	**24**	**296**			**40**	**120**	**10**	**2**	**2**	**2**						
7	ОК	ASBM (ASMP)/ MSPZ (SPKP)/ SPKM (SSPSCSP) 1106	Әлеуметтік-саясаттану білім модулі (әлеуметтану, саясаттану, мәдениеттану, психология)/Модуль социально-политических знаний (социология, политология, культурология, психология)/Social and political knowledge module (Social Studies, Political Studies, Cultural Studies, Psychology)	8	240	24	56			40	120	8								29 1	Емтихан
8	ОК	DSh/FK/PhT 1107, 2107	Дене шынықтыру/Физическая культура/Physical Training	8	240		240					2	2	2	2					30	Емтихан
	БП/ БД/ CS	**Базалық пәндер циклі/ Цикл базовых дисциплин/ Core subjects cycle**		**110**	**3300**	**300**	**544**	**156**	**100**	**500**	**1700**	**5**	**18**	**18**	**23**	**20**	**10**	**10**	**6**		
1-Модуль. Маманның жалпы техникалық негіздері/ Общетехническая основа специалиста/General technical basis of the specialist				**19**	**570**	**57**	**117**	**16**		**95**	**285**	**5**	**5**	**4**				**5**			
9	ВК	ZhM/VM/ HM 1201	Жоғары математика/Высшая математика/Higher mathematics	5	150	15	35			25	75	5								9	Емтихан
10	ВК	IG/IG/EG	Инженерлік геодезия/	5	150	15	35			25	75		5							11	Емтихан

		1202	Инженерная геодезия/ The engineering geodesy																		
11	ВК	AE/AE/AE 4220	Аграрлық экономика/Аграрная экономика/Agrarian economics	5	150	15	35			25	75							5		2	Емтихан
12	КВ	Gid/Gid/Hyd 2208	Гидрохимия/Гидрохимия/ Hydrochemistry	4	120	12	12	16		20	60			4						19	Емтихан
		HSM/HMV/ CMW 2208	Химия және су микробиологиясы/Химия и микробиология воды/Chemistry and microbiology of water																		
2-Модуль. Жұмысты ұйымдастыру және басқару/ Организация работ и управление/Work organization and management				**15**	**450**	**45**	**85**	**20**		**75**	**225**		**5**	**10**							
13	КВ	SGIG/NGIG /DGEG 1204	Сызба геометриясы және инженерлік графика/ Начертательная геометрия и инженерная графика/Descriptive geometry and engineering graphics	5	150	15	35			25	75		5							7	Емтихан
		SSG/ChNG/ DDG 1204	Сызу және сызба геометриясы/ Черчение и начертательная геометрия/Drawing and descriptive geometry																		
14	КВ	GKEZhAZh/ SAPEGS/ CADEHS 2206	Гидротехникалық құрылымдар-дың элементтерін жобалаудың автоматтандырылған жүйесі/ Система автоматизированного проектирования элементов гидротехнических сооружений/ Computer-aided design system for elements of hydrotechnical structures	5	150	15	35			25	75			5						4	Емтихан
		KG/KG/CG 2206	Компьютерлік графика/ Компьютерная графика/ Computer graphics																		
15	КВ	TM/TM/TM 2207	Техникалық механика/ Техническая механика/ Technical mechanics	5	150	15	15	20		25	75			5						7	Емтихан
		IM/IM/EM 2207	Инженерлік механика/ Инженерная механика/ Engineering mechanics																		

3-Модуль. Суды пайдалану/Водопользование/Water use				**31**	**930**	**63**	**83**	**64**	**100**	**105**	**515**		**8**		**13**	**5**	**5**				
16	ВК	IG/IG/EH 1203	Инженерлік гидрометрия/ Инженерная гидрометрия/The engineering hydrometry	6	180	18	18	24		30	90		6							4	Емтихан
17	ВК	Gid/Gid/Hyd 2210	Гидравлика/Гидравлика/ Hydraulics	5	150	15	15	20		25	75				5					4	Емтихан
18	ВК	SM/OM/IM 3219	Суару мелиорациясы/ Оросительная мелиорация/ Irrigation meliorative	5	150	15	15	20		25	75						5			4	Емтихан
19	КВ	SSS/NNS/ PPS 3216	Сорғы және сорғы станциялары/Насосы и насосные станции/ Pumps and pumping stations	5	150	15	35			25	75					5				4	Емтихан
		GK/GU/HPP 3216	Гидрокүштік қондырғылар/ Гидросиловые установки/ Hydraulic power plants																		
20	ВК	OP/UP/TP 1205	Оқу практикасы/Учебная практика/Traning practice	2	60				20		40		2								Диф. сынақ
21	ВК	OP/PP/PP 2213	Өндірістік практика/ Производственная практика/ Productional practice	8	240				80		160				8						Диф. сынақ
4-Модуль.Табиғи ресурстарды пайдалану/ Использование природных ресурсов/Use of natural resources				**24**	**720**	**72**	**112**	**56**		**120**	**360**			**4**	**10**	**5**	**5**				
22	ВК	MT/MP/MS S 3214	Мелиоративтік топырақтану/ Мелиоративное почвоведение/ Meliorative soil science	5	150	15	15	20		25	75					5				4	Емтихан
23	ВК	ME/MZ/MF 3218	Мелиоративтік егіншілік/ Мелиоративное земледелие/ Meliorative farming	5	150	15	15	20		25	75						5			4	Емтихан
24	КВ	GGN/OGG/ FGH 2212	Геология және гидрогеология негіздері/Основы геологии и гидрогеологии/Fundamentals of geology and hydrogeology	5	150	15	35			25	75				5					4	Емтихан
		ZhASIB/ PRPV/GPE 2212	Жер асты суларын іздеу және барлау/Поиск и разведка подземных вод/ Groundwater prospecting and exploration																		
25	КВ	KM/KM/ CM 2209	Климатология және метеорология/Климатология и метеорология/Climatology and	4	120	12	12	16		20	60			4						4	Емтихан

			meteorology																		
		Gid/Gid/Hyd 2209	Гидрометеорология/ Гидрометеорология/ Hydrometeorology																		
26	КВ	GAR/GRS/ HFR 2211	Гидрология және ағынды реттеу/Гидрология и регулирование стока/Hydrology and flow regulation	5	150	15	35			25	75				5					4	Емтихан
		OAR/RRR/ RRB 2211	Өзен арнасын реттеу/ Регулирование русел рек/ Regulation of river beds																		
5-Модуль. Гидротехникалық құрылымдар мен мелиоративтік жүйелерді басқару/Управление мелиоративных систем и гидротехнических сооружении/ Management of meliorative systems and hydrotechnical structures				**21**	**630**	**63**	**147**			**105**	**315**					**10**		**5**	**6**		
27	ВК	ASKEZhS/SOP/AWSIP 3215	Ауылшаруашылығын сумен қамтамасыз ету және жайылымдарды суландыру/ Сельхозводоснабжение и обводнение пастбищ/ Agricultural water supply and irrigation of pastures	5	150	15	35			25	75					5				4	Емтихан
28	КВ	GZhU/OGR/ OHW 4221	Гидромелиоративтік жұмыстарды ұйымдастыру/ Организация гидромелиоративных работ/ Organization of hydromeliorative works	5	150	15	35			25	75							5		4	Емтихан
		MKM/MSM /MCM 4221	Мелиоративтік және құрылыс машиналары/Мелиоративные и строительные машины/ Meliorative and construction machines																		
29	КВ	SRB/UVR/ WRM 4222	Су ресурстарын басқару/ Управление водными ресурсами/Water resources management	6	180	18	42			30	90								6		Емтихан
		SK/VK/WK 4222	Су кадастры/Водный кадастр/ Water cadastre																		
30	КВ	KM/SM/CM 3217	Құрылыс материалдары/ Строительные материалы/	5	150	15	35			25	75					5				4	Емтихан

			Construction materials																		
		IK/IK/EC 3217	Инженерлік конструкциялар/ Инженерные конструкции/ Engineering construction																		
	КП/ ПД/ MS	**Кәсіптік пәндер циклі/ Цикл профилирующих дисциплин/ Major subjects cycle**		**66**	**1980**	**150**	**302**	**48**	**160**	**250**	**1070**					**10**	**20**	**20**	**16**		
6-Модуль. Ауылшаруашылығын сумен қамтамасыз ету/Обеспечение водой сельского хозяйства/Water supply for agriculture				**16**	**480**	**48**	**88**	**24**		**80**	**240**					**5**	**6**	**5**			
31	ВК	GK/GS/HS 3303	Гидротехникалық құрылымдар/ Гидротехнические сооружения/ Hydrotechnical structures	6	180	18	18	24		30	90						6			4	Емтихан
32	ВК	SRKP/KIVR /CUWR 3301	Су ресурстарын кешенді пайдалану/Комплексное использование водных ресурсов/ Complex use of water resources	5	150	15	35			25	75					5				4	Емтихан
33	КВ	MOZhZh/PP RM/PPWM 4308	Мелиорациядағы өндірістік жұмыстарды жоспарлау/ Планирование производственных работ в мелиорации/Planning of production works in melioration	5	150	15	35			25	75							5			Емтихан
		MIShEN/EO IRM/ESES M 4308	Мелиорациядағы инженерлік шешімдердің экологиялық негіздемесі/Экологическое обоснование инженерных решений в мелиорации/ Ecological substantiation of engineering solutions in melioration																		
7-Модуль. Жерді баптау және қорғау/Рекультивация и охрана земель/Recultivation and land protection				**18**	**540**	**54**	**102**	**24**		**90**	**270**						**6**		**12**		
34	ВК	ZhBK/ROZ/ RLP 3304	Жерді баптау және қорғау/ Рекультивация и охрана земель/ Recultivation and land protection	6	180	18	42			30	90						6			4	Емтихан
35	ВК	MZhAP/EA MS/OAMS 4310	Мелиоративтік жүйелерді автоматтандыру және пайдалану/Эксплуатация и автоматизация мелиоративных	6	180	18	42			30	90								6	4	Емтихан

			систем/Operation and automation of meliorative systems																		
36	КВ	TTKB/UPTK/MNTC 4311	Табиғи-техногендік кешендерді басқару/Управление природно-техногенными комплексами/ Management of natural-technogenic complexes	6	180	18	18	24		30	90								6	4	Емтихан
		TUN/OP/FEM 4311	Табиғатты үйлестіру негіздері/ Основы природообустройства/ Fundamentals of environmental management																		
8-Модуль. Жобалау және басқару/Проектирование и управление/Design and management				**32**	**960**	**48**	**112**		**160**	**80**	**560**					**5**	**8**	**15**	**4**		
37	ВК	MZhZh/PMS/DMS 4306	Мелиоративтік жүйелерді жобалау/Проектирование мелиоративных систем/Design of melioretive systems	6	180	18	42			30	90							6		4	Емтихан
38	КВ	LM/ML/LM 3302	Ландшафты мелиорациялау/ Мелиорации ландшафтов/ Landscape melioration	5	150	15	35			25	75					5				4	Емтихан
		Lan/Lan/LS 3302	Ландшафттану/ Ландшафтоведение/ Landscape science																		
39	КВ	IMK/IMS/EMS 4307	Инженерлік-мелиоративтік құрылымдар/Инженерно-мелиоративный сооружения/ Engineering-melioration structures	5	150	15	35			25	75							5			Емтихан
		GZhO/PGR/PHW 4307	Гидротехникалық жұмыстардың өндірісі/ Производство гидротехнических работ/ Production of hydrotechnical works																		
40	ВК	OP/PP/PP 3305	Өндірістік практика/ Производственная практика/ Productional practice	8	240				80		160						8			4	Диф. сынақ
41		OP/PP/PP 4309	Өндірістік практика/ Производственная практика/ Productional practice	4	120				40		80							4		4	Диф. сынақ

42		DAP/PdP/PP 4312	Кәсіби практика/ Профессиональная практика/ Professional practice	4	120				40		80								4	4	Диф. сынақ
	Қорытынды аттестаттау/Итоговая аттестация/Final assessment			**8**	**240**				**80**		**160**								**8**		
43	Дипломдық жұмысты, дипломдық жобаны жазу және қорғау немесе кешенді емтихан тапсыру/Написание и защита дипломной работы, дипломного проекта или подготовка и сдача комплексного экзамена/Writing and defending a diploma thesis, diploma project or preparing and passing a comprehensive exam			8	240				80		160								8	4	
	Барлығы/Итого/Total:			**240**	**7200**	**534**	**1482**	**204**	**340**	**990**	**3650**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**		

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. Modules Competency Map

Codes	Module	Educational competence	Learning outcomes
MC1	**Module. Humanities and language**	aimed at the formation of fundamental source and historiographic materials, as well as for the achievement of modern historical science of Kazakhstan; to determine the role of the history of Kazakhstan in the system of humanitarian knowledge; on revealing the specifics of the object and subject of history of Kazakhstan for the analysis of topical problems of the modern stage of development; on creation of scientifically grounded concept of history of Kazakhstan based on integral and objective coverage of the main stages of ethnogenesis of the Kazakh people, evolution of forms of statehood and civilization in the Great Steppe; on systematization of knowledge of the main events of the modern history of Kazakhstan.	- demonstrate knowledge and understanding of the main stages of development of the history of Kazakhstan - correlate the phenomena and events of the historical past with the general paradigm of world-historical development of human society through critical analysis; - possess the skills of analytical and axiological analysis in the study of historical processes and phenomena of modern Kazakhstan - be able to comprehend objectively and comprehensively the immanent features of the modern Kazakhstan model of development - to systematize and give a critical assessment of historical phenomena and processes in the history of Kazakhstan.
MC2		form a system of general competencies that ensure the socio-cultural development of the personality of the future specialist based on the formation of his ideological, civic and moral positions;	- to evaluate the surrounding reality on the basis of ideological positions, formed by the knowledge of the fundamentals of philosophy, which provide scientific understanding and study of the natural and social world by methods of scientific and philosophical knowledge; - to interpret the content and specific features of the mythological, religious and scientific worldview; - to give assessment to everything happening in the social and industrial spheres;
MC3		develop the ability to interpersonal social and professional communication in the state, Russian and foreign languages;	- implement the use of language and speech tools based on a system of grammatical knowledge; analyze information in accordance with the situation of communication; - to carry out the use of linguistic and speech means based on the system of grammatical knowledge; analyze information in accordance with the communication situation;

MC4	**Module. Professional and communicative**	The development of information literacy through the mastery and the use of modern information and communication technologies in all areas of life and work;	- evaluate the actvities and actions of communication participants. - to use in personal activities various types of information and communication technologies: Internet resources, cloud and mobile services for searching, storing, processing, protecting and distributing information;
MC5		Have an intolerant attitude toward corrupt behavior, respectful of legislation and law.	- analyze events and actions from the point of view of the area of legal regulation and be able to refer to the necessary regulatory acts; - to be guided in the current legislation; using the law, to protect their rights and interests, - to carry out professional activities on the basis of a developed legal awareness, legal thinking and legal culture; - to acquire a sufficient level of legal awareness; - be able to assess the facts and phenomena of professional activity from an ethical point of view; - apply moral rules and norms of behavior in specific life situations
MC6		Be competent to analyze and obtain information in accordance with the basic knowledge of the economy; use the basics of economic knowledge in various fields;able to apply this knowledge in solving situational and practical problems.	- to know the fundamental problems of the functioning of the economy, the mechanism of action and manifestation of economic laws, as well as the main features of the leading schools and areas of economic science; - to be aware of economic terms and categories, use them in their educational activities; - to understand and know the main events of the world and domestic economic history, the course of ongoing reforms in the light of the strategy "Kazakhstan - 2050", development trends in the field of modern business; - to distinguish and compare the behavior of market agents in different types of market structures; - to explain the interaction of economic agents in macroeconomic markets; - to compare the impact of macroeconomic policies in different countries; - to argue their own views on modern macroeconomic phenomena; - to use the knowledge gained in practice to assess the results of economic reforms in Kazakhstan

MC7		To be competent in the application of methods for the implementation of low-waste production and the assessment of the environmental efficiency of economic activity.	- know the contents of the basic terms in the field of ecology, environmental management; modern global and regional environmental problems and their solutions; - be able to apply environmental knowledge to solve and predict possible environmental problems; - apply methods for the implementation of low-waste production and assess the environmental performance of economic activity. - establish causal relationships between phenomena occurring in nature and society, - apply environmental knowledge to solve and predict possible environmental problems.
MC8		Contribute to the ability to apply this knowledge to address the issues of safety and reliability of operation of machinery and equipment and knowledge of the issues of social protection of workers.	- to know the main legislative acts on industrial safety, labor protection, environmental protection and civil protection; - apply the knowledge gained to address the safety and reliability of the operation of machinery and equipment; - ability to evaluate machinery and process equipment in terms of exposure to abnormal situations.
MC9	**Module. Socio-political knowledge and a healthy lifestyle**	form the skills of self-development and education throughout life;	-to assess situations in various spheres of interpersonal, social and professional communication, taking into account the basic knowledge of sociology, political science, cultural studies and psychology; - to synthesize knowledge of these sciences as a modern product of integrative processes; - to use scientific methods and approaches of research of a specific science, as well as the entire socio-political cluster; - develop their own moral and civic position; - operate with the social, business, cultural, legal and ethical norms of Kazakhstan society; - demonstrate personal and professional competitiveness; - to put into practice knowledge in the field of social sciences and humanities, having international recognition; - to make a choice of methodology and analysis; - summarize the results of the study;

			- to synthesize new knowledge and present it in the form of humanitarian socially significant products;
MC10		form a personality capable of mobility in the modern world, critical thinking and physical self-improvement.	- to build a personal educational trajectory throughout life for self-development and career growth, focus on a healthy lifestyle to ensure full social and professional activities through methods and means of physical culture.
Codes	**Module**	**Basic competencies**	**Learning outcomes**
MC11	**Module 1 - General technical basis of a specialist**	Forms fundamental knowledge of natural Sciences.	- calculate the solution of practical problems on the basics of hydromechanics and hydraulics. - Select the fundamental laws of mechanical motion and equilibrium of material bodies, their application in solving specific problems of modern technology. - identify the necessary knowledge of the composition of natural waters and the factors determining it. Classification of the composition of natural waters. General patterns of formation of the chemical composition of natural waters. The processes of metamorphization of waters. The sources of formation of organic matter, nutrients and trace elements in natural waters. Combating pollution of natural waters. Identification of the main components of pollution in natural waters. - to discuss, use geological and hydrological data of the area to assess and determine the necessary amount of survey work in the construction area.
MC12	**Module 2 - Work organization and management**	Forms the engineering and legal literacy of a specialist.	- solve problems using images obtained by parallel projection; apply the rules of the unified system of design documentation; read and detail the general view drawing. - to study the basics of the automated preparation of the graphic part of design documents in the AutoCAD environment, to learn how to perform vectorization. - to review the latest achievements of science and technology in the field of means of automation of design of elements of hydraulic structures, the basic ideas and principles of their use.
MC13	**Module 3 - Water use**	Monitoring of water bodies and organization of technical and material support for the operation of the water	- describe the structure, state of the Earth and the Earth's crust, the material, mineral and petrographic composition and properties of the Earth's crust, and

		treatment plant, water pumping station and wastewater treatment facilities.	endogenous geological processes. - perform calculations. The laws of equilibrium and fluid motion, the peculiarities of filtration processes, methods of hydraulic processes. - choose the organization of works on irrigation (drainage) of agricultural fields using reclamation systems. - explain the management of the process of operation of water treatment station, water pumping station equipment for wastewater treatment.
MC14	**Module 4 - Use of natural resources**	Use geological and hydrological data of the area to assess and determine the necessary amount of survey work.	- land resources and farming. Ameliorative farming. Agricultural land reclamation in different zones of Kazakhstan. Farming systems on reclaimed land. - to tell the general doctrine of climate, climatic zoning of Eurasia, characteristics of climates of Kazakhstan, water vapor inputs in the atmosphere, evaporation from the surface of water and soil. Explain the importance of hydrology for the development of the national economy, integrated use of water resources and their protection. Organization and methods of hydrological observations and research. - identify, plan and organize scientific research in the field of genesis and evolution of soils, biology, chemistry, soil physics, physiology of plant nutrition, agrochemistry and rational application of fertilizers, soil and plant diagnostics, etc.
MC15	**Module 5- Management of meliorative systems and hydrotechnical structures**	Organization of works on assessment of land reclamation state and rational use of water resources. Management of operation process of water treatment station, water pumping station and wastewater treatment equipment.	- describe water management districts of Kazakhstan. General information about water supply; systems and schemes of agricultural water supply; norms and methods of its improvement; water lifting equipment, structures and external networks of water pipes, pasture and field water supply, pasture watering. - formulate organization of works on irrigation (drainage) of agricultural fields using reclamation systems - use methods and techniques of economic analysis in water. Types of economic analysis. Managerial and financial analysis. Analysis of return on assets, material capacity and labor productivity in water - compile general information and

			characteristics of building materials and construction. Raw materials and manufacture. Application of the received materials and construction in the construction of water systems depending on their properties.
Codes	**Module**	**Professional competencies**	**Learning outcomes**
MC16	**Module 6 - Water supply for agriculture**	Planning, preparation and logistical support of construction and repair works at water supply, wastewater disposal and water treatment facilities.	- determination of water filtration in the area of hydraulic structures. Stability and strength of water retaining structures. Dams: ground, concrete, reinforced concrete, wooden. Dams culverts at dams: spillways, culverts, culverts. - to tell about the distribution of available equipment on the production facilities is not effective, as a result of which the work is not done within the planned time, the amount of work is not carried out fully and with increased energy consumption. - cover methods of drawing up water balances, water and water-energy calculations. Pay attention to the creation of water management complexes, their economic justification and management. To consider the protection of water resources from pollution and depletion;
MC17	**Module 7 - Recultivation and land protection**	Organization of agrotechnical and reclamation norms and requirements aimed at land protection and reclamation.	- implementation in practice of agrotechnical and reclamation norms and requirements aimed at land protection and reclamation; - theoretical review of modern ideas about formations formed during interaction of natural objects with artificial ones, natural-technical systems - define the concept of research methodology of water management complex, land reclamation and land protection. Problems of science in the development of research methodology for the conservation of agricultural land fertility.
MC18	**Module 8 – Design and management**	Organization of work to ensure the safety of land reclamation systems and environmental protection measures.	- tell legal regulation of relations in the field of all types of melioration, improvement of meliorative state of irrigated lands. - give definition of properties of minerals, composition and nature of origin, magmatic, sedimentary and metomorphic types of rocks, geochronology, origin of underground waters, their physical and chemical properties - Disclose the topic of water resources

			and the possibilities of their use. Renewable water resources. Problems of modern water supply and compensation of harmful impact of waters; - to reveal reasons of disbalance and destruction of natural system in conditions of anthropogenic human activity, to fix in students' consciousness about the primacy of laws of nature.

5. Summary table showing the volume of loans disbursed by modules of the educational program:
Number of modules-5

Course of study	Semester	Number of studied disciplines			Number of credits						Total in hours	Military training	Number	Diff.off set
		CC	UC	OC	Theoretical training	Physical Training	Productional Practice	Pregraduation practice	Final attestation	Total			Exam	
1	1	5	1	-	30					30	900		6	
	2	3	2	1	28	2				30	900		6	1
2	3	3	-	4	30					30	900		7	
	4	1	1	3	22		8			30	900		5	1
3	5	-	3	3	30					30	900		6	
	6	-	4	-	22		8			30	900		4	1
4	7	-	2	3	26		4			30	900		5	1
	8	-	1	2	18			4	8	30	900		3	1
Total		**12**	**14**	**16**	**206**	**2**	**20**	**4**	**8**	**240**	**7200**	**588**	**42**	**5**

Annex to EP

Annex 1

Discipline information

№	Name of the discipline	Brief description of the discipline (30-50 words)	Number of credits	Formed competencies (codes)
Ceneral education subjects cycle /Core component				
1	History of Kazakhstan	The main stages of the history of Kazakhstan; problems of formation and development of independent statehood in Kazakhstan, spiritual culture; promote the formation of civil position of students, the ability to navigate the events of the internal life of the state and international relations.	5	MC 1
2	Philosophy	The nature of philosophical knowledge, its role in the formation of spiritual and moral value orientations in social and professional activities; to form the worldview and theoretical and methodological foundations of the culture of thinking of the student; the basic principles, categories and laws of philosophy.	5	MC 2
3	Foreign Language	Introduction to the subject area of the specialty in a foreign language. Requirements for the level of foreign language proficiency. Foreign language as a disciplinary phenomenon in the theory of language teaching. Fundamentals of formation of mastery of special subject-linguistic material in water and agriculture. Teaching oral and written foreign language professional and technical communication in water management. Means of implementation of speech communication.	10	MC 3
4	Kazakh (Russian) Language	Expansion of the lexical minimum of common words and word combinations, mastering grammatical forms and constructions at the level of their use in speech. Mastering of the lexical and terminological minimum in the specialty.	10	MC 3
5	Information and Communication Technologies	The role of ICTs in key sectors of societal development. ICT standards. Introduction to computer	5	MC 4

		systems. Architecture of computer systems. Software. Operating systems. Database systems. Data analysis. Data management. Networks and telecommunications. Cyber-security. Internet technologies, etc.		
6	**Social and political knowledge module (Social Studies, Political Studies, Cultural Studies, Psychology)**			
	Social Studies	The 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 labor. Sociology of religion. Problems of employment of population and its regulation. Sociology of family and marriage. Methodology, methodology and technique of sociological research.	2	MC 9
	Political Studies	Political Science as the Science of Politics: Subject, Method, and History of Formation. Power, dominance, legitimacy. Political elites and political leadership. The political system of society. The political regime. Civil society. The political culture of society. Political development in the context of modernization theory. Political ideologies. Political problems of sovereign Kazakhstan. World politics and international relations.	2	
	Cultural Studies	Theoretical and conceptual foundations of cultural studies. The object and subject of culturology. Basic stages of cultural development. Primitive culture-cradle of culture. Antique culture-beginning of classical culture. Middle Ages - features of Western European culture and the culture of the Arab Caliphate. The era of 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	2	

		and activity. Informative psychic processes. Individual-psychological and emotional-volunteer features of personality. Temperament. Character. Ability. Emotions and feelings. Desire.		
7	Physical Training	Physical culture as a part of universal culture, healthy lifestyle, its main components, social and biological basis of adaptation of human organism to physical and mental activity, preparation for independent physical culture and sport, age physiology, self-control of physical condition, psychophysical basis of physical culture and sport, hygiene.	8	MC 10
Ceneral education subjects cycle/ Optional component				
8	Law and anti-corruption culture	The purpose of the discipline is the education of Kazakhstani patriotism as a necessary condition for the improvement of legal statehood in the Republic of Kazakhstan, the formation of students' world knowledge, the improvement of public, legal culture and private legal knowledge. Improving legal literacy within the framework of anti-corruption legislation and the formation of anti-corruption views of students, standards of behavior, negative attitude to any manifestations of corruption.	5	MC 5 LO-1,2
9	Economics	The content of the "Economics" course is aimed at mastering the basic knowledge of the economic life of the society, in which the economic activities of individuals, different enterprises and the state are carried out. The course contributes to the development of economic thinking among students and the ability to make rational decisions with limited natural resources. This discipline contributes to the formation of readiness to use the acquired knowledge about the functioning of the economy to guide the choice of profession and further education. After mastering the course, students will be able to navigate current economic events, understand the features of modern	5	MC 6 LO-2,14

		economics.		
10	Ecology	Acquisition of theoretical knowledge in the field of ecology, improving environmental literacy of students, acquiring the ability to apply this knowledge in professional and other activities.	5	MC 7 LO-2,14
11	Life Safety	The course "Life Safety" reveals issues of comprehensive understanding of the sources, quantity and significance of the traumatic and harmful factors of the environment, the principles and methods of qualitative analysis of hazards, general strategy, safety principles and economic feasibility of life safety measures.	5	MC 8 LO-1,2
12	Entrepreneurship	The Entrepreneurship course will teach you how to develop the right competencies that will be useful in the life of any entrepreneur, understand how to create a team for your project, learn how to choose the right business idea based on market needs, develop a business model and write a business plan to start your business.	5	MC 8 LO-1,2
13	Fundamentals of Scientific Research	The course reveals the basics of scientific research methodology, considers the different levels of scientific knowledge. The stages of research work, including the choice of the direction of research, setting the scientific and technical problem, conducting theoretical and experimental research, recommendations for the registration of the results of scientific work are covered.	5	MC 8 LO-1,2
Core subjects cycle/ University component				
14	Higher mathematics	The study of fundamental concepts, laws and theory of classical mathematics. Ability to build mathematical models, to set mathematical problems and select suitable mathematical methods and algorithms of problem solving. Formation of scientific outlook and logical thinking. To conduct qualitative mathematical research, on the basis of the conducted mathematical analysis to develop practical recommendations.	5	MC 11 LO-3

15	The engineering geodesy	A science that studies the shape and dimensions of the surface of the Earth or its individual areas by means of measurements and their computational processing, building plans, maps and profiles, which are used in solving engineering, economic and other problems. Geodesy is of great importance in conducting the state land cadastre, to provide information about the land in order to organize its rational use and protection, regulate land relations, land management, substantiate the amount of payment for land, and evaluate economic activities.	5	MC 11 LO-4
16	Agrarian economics	"Agrarian Economics" studies the operation of objective economic laws and forms of their manifestation in agriculture, production relations in conjunction with other areas of material production, based on the results of research in natural, technical and other related sciences.	5	MC 11 LO-2,14
17	The 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.	6	MC 13 LO-7,14
18	Hydraulics	Questions of hydrostatics and hydrodynamics, practical application of the laws of hydraulics, in addition to the successful study of the discipline provides for laboratory classes, in which the student has the opportunity to observe all the flowing phenomena.	5	MC 13 LO-5,14
19	Irrigation meliorative	Different types and methods of irrigation and methods of impact on natural processes, methods and technical means of regulating land reclamation regimes are considered.	5	MC 13 LO-8,14

		The ameliorative condition of lands is analyzed and evaluated, the reasons and the degree of its non-compliance with the requirements of land use are established. Attention is paid to irrigation systems and networks, their design and calculation.		
20	Meleorative soil science	Origin, development, structure, composition, properties, geographical distribution and soil management. Explores the role of soil in biosphere processes, factors and conditions of soil formation, main soil processes, lithosphere, biosphere environment, zoning law, main types and properties of soils and geographical zones.	5	MC 14 LO-7,8,14
21	Meliorative farming	The requirements of plants to the factors and conditions of plant life, the laws of farming and farming systems of reclaimed land. Fertilizers of reclaimed lands, their values and types are analyzed and evaluated. Attention is paid to weed plants, pests, diseases and their control, biological bases of irrigation of agricultural crops.	5	MC 14 LO-7,8,14
22	Agricultural water supply and irrigation of pastures	Agricultural water supply and pasture watering - systems and schemes of agricultural water supply, water lifting equipment, structures and external networks of water pipes, the most effective systems of pasture watering, measures to prevent water scarcity and current state of water resources use.	5	MC 15 LO-10,14
Core subjects cycle / Optional component				
23	Hydrochemistry	Formation of ideas about the regularities of changes in the chemical composition of natural waters in space and time, methods of research of these regularities.	4	MC 11 LO-3
24	Chemistry and microbiology of water	Basic concepts and laws of chemistry. The main classes of inorganic compounds. The periodic law, the periodic system of D.I. Mendeleev. The state of chemical equilibrium, Le Chatelier-Brown principle. Liquid state of matter. Ways of expressing concentrations of solutions.	4	MC 11 LO-3

25	Descriptive geometry and engineering graphics	Solve problems using images obtained by parallel projection; apply the rules of the unified system of design documentation; read and detail the general view drawing.	5	MC 12 LO-4
26	Drawing and descriptive geometry	The method of projection and projection with numerical marks. Point, line, plane and surface projections with numerical marks. Epture of a point, line, plane. Methods of projection transformation. Epurus of the surface. Deployment of the surface. The general rules of drawing execution. Geometrical drawings.	5	MC 12 LO-4
27	Computer-aided design system for elements of hydrotechnical structures	Studying the basics of the automated preparation of the graphic part of design documents in the AutoCAD environment, learn how to perform vectorization.	5	MC 12 LO-5
28	Computer graphics	Modern technologies of development and analysis of information and effective methods of information processing using modern computers; And also the formation of information systems in the field of production, processing.	5	MC 12 LO-5
29	Technical mechanics	Basic concepts and axioms of mechanics; methods of transformation of systems of forces; conditions of equilibrium of solid bodies under the action of forces; methods of point motion setting, determination of its speed and acceleration; progressive, rotational and flat motion of the body, complex motion of the point.	5	MC 12 LO-3
30	Engineering mechanics	Engineering mechanics is a branch of mechanics, that is, the science of mechanical motion and mechanical interactions of material bodies. Engineering mechanics describes the basic laws and principles of mechanics and studies the general properties of motion of mechanical systems.	5	MC 12 LO-3
31	Pumps and pumping stations	General information about pumps, pumping units and pumping stations; especially consider in detail vane pumps; disclose to the future specialist the concept of "pumping station hydraulic unit", disassemble the elements that make up it, the	5	MC 13 LO-9

		scheme of pumping station hydraulic units in irrigation, drainage systems with different water intake and supply methods.		
32	Hydraulic power plants	Teaching about pumps, pumping units, pumping systems and pumping stations used to supply water for domestic and drinking water supply and in the reclamation system for irrigating crops on irrigated land.	5	MC 13 LO-9
33	Fundamentals of geology and hydrogeology	Formation of future specialists ' knowledge and practical skills about geology and hydrogeology. Study of the structure and properties of the Earth and the earth's crust, rock-forming minerals and rocks.	5	MC 9 LO-7
34	Groundwater prospecting and exploration	Familiarization with the complex of techniques and methods by which underground water exploration is carried out, their reserves are identified, as well as quantitative and qualitative assessment of underground water for solving various economic problems.	5	MC 14 PO-5,7
35	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.	4	MC 14 LO-5,7
36	Hydrometeorology	The discipline studies climate as the most important environmental factor. Ecological characteristics of the atmosphere as a habitat. The role of the climatic regime in the formation of the ecological state, monitoring of changes in the ecological and climatic state, anthropogenic impacts and ways to overcome environmental crises associated with climate change and atmospheric pollution.	4	MC 14 LO-7
37	Hydrology and flow regulation	Hydrology - knowledge of the factors and patterns of formation of river flow; regimes of rivers, lakes, swamps; methods and technical means of measuring and determining the main hydrological characteristics of streams and reservoirs; theoretical foundations and methods of engineering	5	MC 14 LO-7

		hydrological and water management calculations.		
38	Regulation of river beds	The main task of river channel regulation is to change channel processes by means of various structures and devices in such a way that a more stable channel is formed as a result, preserving the shape and size given to it for a long time at minimum operating costs.	5	MC 14 LO-7
39	Organization of hydromeliorative works	The course is designed to replace manual labor with machine labor in the construction and operation of land reclamation facilities. Application of special machines and mechanisms increases labor productivity, reduces labor intensity of works, allows applying the latest technologies. When carrying out irrigation and drainage works, as a rule, the following technological processes are mechanized: construction of drainage and irrigation canals, arrangement of collector-drainage systems, production of cultural and technical works, planning and leveling of reclaimed lands, irrigation measures, watering of green plantations, etc.	5	MC 15 LO-9
40	Meliorative and construction machines	The technical and operational indicators of modern tracked and wheeled tractors are considered. Machines for the cultivation of reclaimed land. Machines for cultural and technical works. Machines for earthmoving and transportation. Ditchers and drainage ditchers. Machines for field irrigation.	5	MC 14 LO-6
41	Water resources management	The discipline reviews the current state of water resources management in the context of sustainable development, the concept of integrated water resources management, the rationale for implementing integrated water resources management for the conditions of Kazakhstan, the legislative framework of water resources management, national water policy and national water resources management strategy, the basic strategic principle of	6	MC 15 LO-13

		integrated water resources management, functioning of the basin councils, information.		
42	Water cadastre	The discipline is designed to provide a systematic summary of documented information about water bodies owned by the state, ownership of the subjects of the RK, municipalities, individuals, legal entities and individual entrepreneurs, about the use of water bodies, river basins and basin districts.	6	MC 15 LO-13
43	Construction materials	Examines the building materials products recommended for the construction of buildings and hydraulic structures, raw materials for their production, the main physical-mechanical and chemical properties, the scope of application, methods of transportation and storage.	5	MC 15 LO-6
44	Engineering construction	The peculiarities of structural solutions of hydromeliorative buildings and structures, loads and impacts on them, as well as the concept of economic efficiency of structures are considered.	5	MC 15 LO-6
Major subjects cycle/ University component				
45	Hydrotechnical structures	Formation of professional skills for design and calculation of hydraulic structures on the land reclamation network, give skills for modeling and construction and operation of water intake facilities and reservoir hydrosystems.	6	MC 16 LO-10,14
46	Complex use of water resources	The main water consumers, their features, requirements for water sources and influence on other water consumers are considered. Methods of drawing up water management balances, water management and water-energy calculations are highlighted. Attention is paid to the creation of water management complexes, their economic justification and management. Issues of protection of water resources from pollution and depletion are considered.	5	MC 16 LO-13,14
47	Recultivation and land protection	It has applied importance for the implementation in practice of agrotechnical and reclamation	6	MC 17 LO-12,14

		norms and requirements aimed at the protection and reclamation of land. Mastering the discipline will help students form the necessary knowledge and practical skills, sufficient for their future activities, and allow them to independently master new knowledge in the field of agronomic science.		
48	Operation and automation of meliorative systems	Studies the skills of effective use of water and land resources, operation of hydro-melioration systems and structures on them, solve the main problems of water production from a scientific and creative point of view, correctly operate water facilities, plan and correctly evaluate water resources, implement water-saving irrigation technologies.	6	MC 17 LO-11,14
49	Design of melioretive systems	To design reclamation systems effectively, to solve the main problems of water management design from the scientific and creative point of view, to design water management facilities correctly, to be able to plan and evaluate water funds of the RK, to conserve reclamation resources of irrigated areas, to determine the economic efficiency of reclamation measures.	6	MC 18 LO-10,14
	Major subjects cycle/ Optional component			
50	Planning of production works in melioration	The course deals with the methodology and procedure of developing the main sections of the project: the choice and justification of methods and methods of production of the main types of work in the construction of irrigation and drainage systems; development of construction technology of open drainage channels; closed drainage and wetting systems; production of cultural works on reclaimed land; making process maps; calendar plan of works.	5	MC 16 LO-6,12
51	Ecological substantiation of engineering solutions in melioration	Covers the prediction and modeling of natural processes. Outlines the methods of types of environmental engineering systems and their stages of creation and operation of business evaluation of environmental	5	MC 16 LO-6,12

		engineering projects.		
52	Management of natural-technogenic complexes	Considered in the theoretical knowledge of the methodology of management of objects of nature management and water use, using a systematic approach and mathematical modeling; applied knowledge in the development of forms and methods of management of natural and anthropogenic complexes.	6	MC 17 LO-11,13
53	Fundamentals of environmental management	The basics of nature management are considered. Problems of nature use and nature management in the system of agricultural land reclamation. Theoretical foundations of agricultural land reclamation. Ecological principles of agricultural land reclamation.	6	MC 17 LO-11,13
54	Landscape melioration	The discipline refers to the subjects of the biological and natural science cycle and is part of its basic part and gives students an idea of the structure of the landscape shell of the Earth and its individual structural components: natural and natural-anthropogenic systems.	5	MC 18 LO-13
55	Landscape science	The discipline "Landscape science" refers to the subjects of biological and natural sciences cycle and is a part of its basic part. It studies the properties of landscapes (geosystems): integrity, openness, structure, dynamics, development, stability.	5	MC 18 LO-13
56	Engineering-melioration structures	Studies to skills of efficient use of water and land resources, solving main problems of water production from scientific and creative point of view, proper operation of water facilities, planning and proper assessment of water funds, implementation of water-saving irrigation technologies, determining economic efficiency of reclamation measures.	5	MC 18 LO-10,11
57	Production of hydrotechnical works	The course deals with the organization and technology of hydraulic engineering works. Considerable attention is paid to the production of excavation and concrete work. The basic technologies for their production,	5	MC 18 LO-10,11

		recommendations on the use of machines and mechanisms are given. Considered issues of the organization of work in difficult climatic conditions.		

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