Ministry of Agriculture of the Republic of Kazakhstan
S.Seifullin Kazakh Agrotechnical University

Considered at the meeting of the
University Academic Council
Protocol № 15
«28» 05 2020

APPROVED
by First Vice Chairman of the Board
of «S.Seifullin Kazakh
AgroTechnical University» NCJSC
_____ A. M. Abdyrov
_____2020

EDUCATIONAL PROGRAM «AGRONOMY»

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

Code and classification of training areas: 6B081 Plant growing

Code in the International Standard Classification of Education: 0812

Awarded academic degree: Bachelor of Agriculture in the "Agronomy" educational program

Duration of study: 4

Nur-Sultan, 2020

Authors:

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The team of authors approved by the order of S. Seifullin KATU NCJSC No. 932-H of 12.12.2018.

The educational program "Agronomy" was reviewed at a meeting of the Department "Agriculture and Crop Production" Protocol No. 9 of "20" may 2020, approved by the Council of the Agronomy Faculty Protocol No. 10A "26" may 2020.

The Dean of the faculty of agronomy Stybaev G. J.

Head of the Department Amantayev B. O.

Content

1 Passport of the educational program

1.1 The purpose of the educational program

The purpose of the "Agronomy" educational program is to form graduates of professional personal qualities, general cultural and professional competences in accordance with the requirements of training a specialist in the field of plant growing and satisfying employers' requirements.

Objectives of the educational program:

1. Providing conditions for obtaining high-quality professional education;
2. Formation of human and social-personal values of the graduate, as well as environmental, physical, ethical, legal culture, culture of thinking;
3. Education in the spirit of patriotism, friendship of the peoples of the Republic of Kazakhstan, respect for different cultures, traditions and customs;
4. Formation of the basic knowledge which necessary for the development of professional disciplines;
5. Creating conditions for mastering agronomical concepts and principles, developing skills for analyzing organizational and technological situations and the practical Annex of acquired knowledge, enabling a graduate to work successfully in the field of crop production in various forms of ownership;
6. To prepare the graduate for professional activities, mobility, continuous professional and moral improvement and growth throughout life;
7. Formation of graduates' competitiveness in the labor market to ensure the fastest possible employment in the specialty.

1.2 General characteristics of the educational program

The educational program "Agronomy" was created on the basis of the request of employers in connection with the increased need for specialists who have general cultural, professional and specialized competences in the field of crop production, contributing to its social mobility and demand for the labor market.

The features of the program being implemented consist in the formation and development of socio-professional, practice-oriented competence, which allows combining socio-personal and professional competences to solve problems in the field of agriculture and plant growing.

The educational program "Agronomy" was developed in accordance with the classification of training areas with higher and postgraduate education (Approved by the order of the MES RK No. 569 of October 13, 2018) and coordinated with the Dublin descriptors and the European Qualifications Framework.

The educational program is focused on providing comprehensive and high-quality training of competitive, highly qualified specialists who are capable of solving theoretical and practical tasks of professional activity in modern conditions based on the development of skills and abilities necessary for a future specialist in combination with the requirements of advanced technologies.

The educational program is developed on the basis of a modular system for studying disciplines and consists of 14 modules. The total amount of theoretical undergraduate education is 240 credits, including the cycle of general education

disciplines includes 56 credits, the cycle of basic disciplines - 112 credits, the cycle of majors - 60 credits and the final certification is 12 academic credits.

2 Competency model (portrait) of the graduate

2.1 Professional activities

Graduates of the educational program "Agronomy" can work in enterprises and organizations of the agro-industrial complex; agrofirms; organizations assessing the quality of crop production; quarantine services; plant protection stations; agricultural research institutions; in secondary special educational institutions, institutions for variety testing of agricultural crops; institutions of agrochemical service, in the apparatus of local, district regional, republican structures.

2.2 Types of professional activity

Bachelors of the educational program "Agronomy" can perform the following professional activities:

- industrial and technological activities;
- organizational and management activities;
- experimental research;
- educational pedagogical activity in secondary vocational schools in the direction of crop production.

2.3 General educational competencies

To know the prerequisites for the formation of the statehood of modern Kazakhstan; general principles of being and cognition, the relationship of man and the world, the laws of formation of the personality of a specialist with higher professional education, the laws of the emergence of political phenomena (institutions, relationships, processes), the ways and forms of their functioning, methods of managing political processes, consciousness, structure of society, norms and values, ways and features of the functioning of the elements of society, features of the processes of individuals and their role in the development of society; language and speech means, vocabulary, forms and types of speech / communication of the state, Russian and foreign languages; types of information and communication technologies; means of automation of information activities and their purpose, methods for measuring the amount of information; purpose and types of information models, purpose and functions of operating systems.

Must show the ability to argue their own assessment of everything happening in the social and production spheres on the basis of ideological positions; make a choice of methodology and analysis in the field of such activities; assessment of situations in various spheres of interpersonal, social and professional communication; operate with public, business, cultural, legal and ethical norms of Kazakhstan society; use in their personal activities various types

of information and communication technologies; build a personal educational trajectory throughout life for self-development and career growth.

Possess skills: practical Annex of knowledge in the field of social, social and human sciences; communication in oral and written forms in Kazakh, Russian and foreign languages, solving problems of interpersonal, intercultural and professional communication.

2.4 Basic competencies

Bachelors of this Educational Program **must know and understand** the basics of the legislation of the Republic of Kazakhstan in the field of professional activity; the structure and functioning of biological objects, the essence of biological processes, the cycle of substances and the transformation of energy in the cell, the body; nomenclature of inorganic and organic compounds; the structure of the main classes, the classification and patterns of the occurrence of organic reactions; soil classification, fertility assessment techniques and soil reproduction; epiphytic, pathogenic and pathogenic microflora of plants and soil, methods of regulating its vital activity; tillage, sowing and harvesting units, schemes of their use, technological adjustments of agricultural machines; method of calculating organic and mineral fertilizers, types, methods and technology of their Annex; causes of diseases, species composition of pests and pathogens of agricultural plants and their biology; modern methods and means of protecting plants from pests, diseases and weeds; fundamentals of a modern market economy.

Bachelors **should demonstrate the ability** to form professional ideas with critical argumentation; coordinate professional activities on the assigned site with the activities of other sites; evaluate the development prospects of the economy in the market; use agrometeorological information in the manufacture of products; carry out the adjustment of agricultural machinery, equipment, set the seeding rate, fertilizer, determine the method of assessing the fertility of the soil and its regulation on the basis of fertilizer Annex; diagnose pests and plant diseases; develop, justify and apply systems of protective and preventive measures against pests, diseases and weeds; evaluate the quality of field work.

Bachelors **must have the skills** to use modern IT, including databases and software packages for crop production; work with microorganisms, microscopy, identification, microbiological analysis of soils, soil and plants; in legal matters to resolve disputes arising in the team, with business entities; verbal and written professional communication in Kazakh, Russian and foreign languages; protection in emergency situations; work with regulatory and legal literature, labor legislation.

2.5 Professional competencies

Bachelors ***must know and understand*** the laws of agriculture and crop production; crop rotation system, tillage systems for crop rotation, taking into account fertility; main types of crops, their economic values, morphological and biological features; modern technology of cultivation of crops; seed production and

the basics of crop breeding; crop varieties and their selection for the specific conditions of the region according to the level of intensification of farming, preparation of seeds for sowing, methods for determining the quality of sowing material; requirements of state standards for sowing material and quality of crop products, technologies for improving and rational use of natural and natural forage lands, preparation of coarse and succulent fodder; basics of storage, primary processing, processing of crop products;

bachelors ***should be able*** to develop, implement, monitor, evaluate and adjust the components of the technological process in the production of crop production; to make technological maps of cultivation and organize field work in accordance with them; calculate the needs of the economy in seeds, fertilizers, pesticides, fuel and lubricants, agricultural machines, tools and equipment, labor resources; to document and keep records in the framework of professional activities;

Bachelors ***should have skills*** in solving organizational and economic issues; Annex of modern technology of cultivation of agricultural crops; on making adjustments to agrotechnical methods and developing recommendations for the effective and rational use of land and the bioclimatic resources of the zone; to distribute labor resources, to give clear and effective instructions, observing the progress of work in the production of crop products.

3 Places of professional practice

The educational program provides for educational practice (in the disciplines of agrometerology, biology) - 3 credits, technological practice (in the disciplines of plant protection, soil science, agricultural mechanization) - 6 credits, practical training (in the disciplines of agriculture, plant growing) - 12 credits and pre-diploma practice - 3 credits, which are the university component and represent a type of study directly oriented to the professional and practical training of students.

Students' professional practice is planned mainly during the spring sowing campaign and harvesting of agricultural crops, on the campus of S.Seifullin Kazakh Agrotechnical University, on the fields of large agricultural enterprises and farms and on experimental fields of research institutes.

LLP "Kazakh Research Institute of Agriculture and Plant Growing", LLP "A. Baraev Scientific - Production Center of grain farming", LLP "Kaz Research Institute of Livestock and Feed Production", LLP "Research Institute of Potato and Vegetable Growing", LLP "Pavlodar Research Institute of Agriculture", LLP "South - West Scientific Research Institute of Animal Husbandry and Plant Growing ", East Kazakhstan Research Institute of Agriculture LLP, Kaz Research Institute of Rice Industry LLP, North Kazakhstan Research Institute of Agriculture LLP, Kostanai Research Institute of Agriculture LLP, Karabalyk Agricultural Test Station LLP, "Experimental Station of Karaganda", Experimental Economy of Oilseeds LLP, Republican Scientific-Methodical Center of Agrochemical Service State Enterprise, Tselinnaya Regional Inspectorate for Trial of Agricultural Crops, Ministry of Agriculture, S. Seifullin Agro-Technical University Campus, large firms, large agricultural enterprises and farms, including TNK Agrofirm LLP,

Bayserke Agro LLP, SC Food Ltd, Fermer 2002 LLP, Maksimovskoye LLP, Rodina LLP, Atameken LLP Agro ", LLP" Akmola Phoenix ", LLP" Alibi Agro They are places of practical training.

Professional practices are conducted in stationary, mobile, field-field methods.

For persons with disabilities, the choice of practice sites is consistent with the requirement of their availability for these students and their state of health.

4 Structure of the educational program

N	Name of cycles and disciplines	Total complexity	
		in academic hours	in academic credits
1	2	3	4
1	Cycle of general education (OOD)	1680	56
1)	Required component	1530	51
	Modern history of Kazakhstan	150	5
	Philosophy	150	5
	Foreign language	300	10
	Kazakh (Russian) language	300	10
	Information and communication technology (in English)	150	5
	Political Science and Sociology	120	4
	Psychology and Cultural Studies	120	4
	Physical education	240	8
2)	University component	150	5
	Fundamentals of economic theory and law	150	5
2	The cycle of basic disciplines (DB)	3300	110
1)	University component	1980	66
	Inorganic and organic chemistry	150	5
	Biology	150	5
	Plant physiology and biochemistry	150	5
	Plant genetics	150	5
	Plant cell culture	150	5
	Educational practice in biology	30	1
	Agrometeorology	150	5
	Biology of plant ontogenesis	150	5
	Educational practice in agrometerology	30	1
	Soil science and agrochemistry	240	8
	Evolutionary theory	150	5
	Crop Protection	150	5
	Technological practice in the discipline of crop protection	120	4

	Agricultural mechanization	150	5
	Technological practice in the discipline of agricultural mechanization	90	3
2)	Component of choice	1320	44
	Professional foreign language	180	6
	Professionally-oriented foreign language	120	4
	Physicolloid and analytical chemistry	150	5
	Microbiology	150	5
	Cytology	150	5
	Basics of scientific research	150	5
	Information technology in crop production	150	5
	Fundamentals of agribusiness and entrepreneurship	150	5
	Adaptive technology in crop production	150	5
3	The cycle of the main disciplines (PD)	1890	63
1)	University component	1050	35
	Crop Breeding	300	10
	Seed research	150	5
	Seed production and varietal technology of crops	150	5
	Internship	360	12
2)	Component of choice	840	28
	Agriculture	150	5
	Crop production	150	5
	Cell technology in crop production and breeding	150	5
	Genetic bases of breeding	150	5
	The technology of primary processing and storage of seeds	150	5
	Undergraduate practice	90	3
4	Additional types of training (DVO)		
1)	Component of choice (military training and other types of learning activities determined by the student independently)		
5	final examination	360	12
1)	Writing and defending a thesis (project) or preparing and passing a comprehensive exam	360	12
	Total	7200	240

Annex 1. Academic calendar ***

Academic calendar for the 2020-2024 academic year for the educational program "Agronomy" in the field of training 6B081 Agronomy

Courses	Aug	September				October				November				December					January				February				March					April				May				June					July				August				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	1	8	15	22	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30	7	14	21	28
			1	2	3	4	5	6	7	8	9	10								1	2	3	4	5	6	7	8	9	10				1	2	3	4	5	6	7	8	9	10											
I		PW	.	.	.	.	.	.	.	.	.	.	S	S	3C	3C	H	H	H	.	.	.	.	.	.	.	.	.	.	S	H	.	.	.	.	.	.	.	.	.	.	S	ZD/H	SS/H	SS/H	SS/H	SS/H	SS/H	H/SS	H	H	H	H
II	H	H	.	.	.	.	.	.	.	.	.	.	S	S	ZD	ZD/WS	H	H	H	.	.	.	.	.	.	.	.	.	.	S	S	H	/TP	/TP	/TP	/TP	/TP	/TP	/TP	/TP	/TP	/TP	S	S	TP/SS	TP/SS	TP/SS	TP/SS	TP/SS	H/SS	H	H	H
III	H	H	.	.	.	.	.	.	.	.	.	.	S	S	ZD	ZD/WS	H	H	H	.	.	.	.	.	.	.	.	.	.	S	S	.	.	.	.	.	S	PP	PP	PP	PP/MT	PP/MT	PP/MT	PP/MT	H/MT/SS	SS/H	SS/H	SS/H	SS/H	PP/SS	PP	PP	PP
IV	PP	PP	.	.	.	.	.	.	.	.	.	.	S	S	ZD	ZD/WS	.	.	.	.	.	.	.	.	.	.	.	S	S	H	.	.	.	S	UP	UP	UP	D	D	D	D	D	D	SE	SE								

PW-presentation week
• theoretical training
BK-border control
S-examination session
SS-summer semester

EP-educational practice
PP-production practice
TP-technological practice
UP-undergraduate practice
WS - winter semester

H-holidays
MT-military training
D-diplom design
OL-overview lectures
SE - state examinations

Holydays

Day of knowledge	1 September	International Women's Day	8 Mart
Day of the first President of RK	1 December	The holiday "Nauryz"	21-23 Mart
Independence day	16 - 17 December	Day of Unity of People of Kazakhstan	1 May
New Year	1-2 January	Defender of the Fatherland Day	7 May
Constitution Day of Kazakhstan	30 August	Victory Day	9 May

*** Considered and approved at the beginning of the academic year

Annex 2. Working curriculum

WORKING CURRICULUM
For the modular education program "Agronomy"
In specialty B077 – Plant breeding
Course years 2020-2024
Academic degree : Bachelor
Form of education: Full-time (bachelor 4 years) trimester
Entry year : 25-05-2020

Module code	Module name	Discipline cycle	Discipline component	Code of subject	Subject name	Academic credits	Study semesters	Control by semesters		Number of hours							Distribution of credits on courses and semesters											
											Classroom work				Independent		1 course			2 course			3 course			4 course		
								Exams(semester)*	Term paper / Course project (term)	Total	Lectures	Laboratory trainings	Practice	Studio lessons	Independent work of students with faculty staff	Independent work of students	1 sem	2 sem	3 sem	4 sem	5 sem	6 sem	7 sem	8 sem	9 sem	10 sem	11 sem	12 sem
																	Weeks of term											
																	10	10	10	10	10	10	10	10	10	10	10	10
General modules																												
1	Language of the discipline	GER	CS	KRYa 1102	Kazakh (russian) language	2	1	1		2/60			2,7/40		10	10	2.0											
2		GER	CS	IYa 1116	Foreign language	2	1	1		2/60			2,7/40		10	10	2.0											
3		GER	CS	KRYa 1105	Kazakh (russian) language	2	2	2		2/60			2,7/40		10	10		2.0											
4		GER	CS	IYa 1106	Foreign language	2	2	2		2/60			2,7/40		10	10		2.0											
5		GER	CS	IYa 1109	Foreign language	1	3	3		1/30			1,3/20		5	5			1.0										
6		GER	CS	KRYa 1117	Kazakh (russian) language	1	3	3		1/30			1,3/20		5	5			1.0										
7		BS	ES	POIYa 2205	Professionally-oriented Foreign Language	3	5	5		3/90			2/30		12	48					3.0								
8	Socio-political disciplines	GER	CS	PS 1103	Political science and sociology	4	1	1		4/120	1,3/20		1,3/20		16	64	4.0											
9		GER	CS	KP 1119	Cultural studies and psychology	4	1	1		4/120	1,3/20		1,3/20		16	64	4.0											
10	Social disciplines	GER	CS	SIKG 1101	The modern history of Kazakhstan (SE)	5	1	1		5/150	1,3/20		2/30		20	80	5.0											
11		GER	CS	Fil 2113	Philosophy	5	6	6		5/150	2/30		1,3/20		20	80						5.0						
12	Physical education	GER	CS	FK 1104	Physical education.	2	1			2/60			4/60		0	0	2.0											
13		GER	CS	FK 1107	Physical education.	1	2			1/30			2/30		0	0		1.0										
14		GER	CS	FK 1110	Physical education.	1	3			1/30			2/30		0	0			1.0									
15		GER	CS	FK 2111	Physical education.	1	4			1/30			2/30		0	0				1.0								
16		GER	CS	FK 2112	Physical education.	1	5			1/30			2/30		0	0					1.0							
17	Computer science	GER	CS	IKT 1108	Information and communication technologies	2	2	2		2/60	1,3/20	1,3/20.0			10	10		2.0										
18		GER	CS	IKT 1118	Information and communication technologies	3	3	3		3/90	2/30	2/30.0			20	10			3.0									
19		BS	ES	ITR 2203	Information technology in crop production	4	5	5		4/120	1,3/20		1,3/20		16	64					4.0							
20		BS	ES	SAVD 2206	Statistical analysis and data visualization	3	5	5		3/90	0,7/10		1,3/20		12	48					3.0							
21		BS	ES	YaPAD 3207	Python language and data analysis	3	7	7		3/90	0,7/10		1,3/20		12	48							3.0					
22	Economic disciplines	GER	UC	OTOBZh 1120	Labor protection and basics of life safety	5	3	3		5/150	1,3/20		2/30		20	80			5.0									
23		BS	UC	AES 4208	Land economics and statistics	4	10	10		4/120	1,3/20		1,3/20		16	64										4.0		
24		BS	ES	OAP 4204	Fundamentals of agribusiness and entrepreneurship	4	11	11		4/120	1,3/20		1,3/20		16	64											4.0	
Modules of specialty/education programm																												
25	Mathematics	BS	UC	VM 1224	Higher Mathematics*	2	2	2		2/60	1,3/20		1,3/20		10	10		2.0										
26		BS	UC	VM 1227	Higher Mathematics*	2	3	3		2/60	1,3/20		1,3/20		10	10			2.0									
27		BS	ES	MMM 3215	Methods of Mathematical Modeling	5	7	7		5/150	1,3/20		2/30		20	80							5.0					
28	Chemistry	BS	UC	NOH 1201	Inorganic and organic chemistry	2	2	2		2/60	1,3/20	1,3/20.0			10	10		2.0										
29		BS	UC	NOH 1225	Inorganic and organic chemistry	2	3	3		2/60	1,3/20	1,3/20.0			10	10			2.0									
30		BS	UC	AFH 2216	Analytical and physical and colloid chemistry	5	6	6		5/150	1,3/20	2/30.0			20	80						5.0						
31		BS	ES	FHMI 3217	Physical and chemical research methods	3	7	7		3/90	0,7/10	1,3/20.0			12	48							3.0					
32	Physics	BS	UC	OF 1226	Bases of physics	2	2	2		2/60	1,3/20	0,7/10.0	0,7/10		10	10		2.0										
33		BS	UC	OF 1209	Bases of physics	2	3	3		2/60	1,3/20	0,7/10.0	0,7/10		10	10			2.0									
34		BS	ES	OTE 2210	Bases of termodynamics and electromagnetism	5	4	4		5/150	1,3/20	2/30.0			20	80				5.0								
35		BS	ES	Bio 3211	Biophysics	4	7	7		4/120	1,3/20	1,3/20.0			16	64							4.0					

36	Technology of production, storage and processing of plant-grower products	BS	ES	VS 1229	Introduction to specialty	2	2	2		2/60	1,3/20				8	32		2.0											
37		AS	ES	Kor 4307	Forage production	5	11	11		5/150	1,3/20	2/30.0			20	80												5.0		
38		AS	ES	THPRP 4308	Technology of storage and processing of plant products	5	11	11		5/150	1,3/20	2/30.0			20	80												5.0		
39		AS	ES	Plo 4309	Horticulture	5	12	12		5/150	1,3/20	2/30.0			20	80														5.0
40		AS	UC	PP 4304	Pregraduation practice	3	12			3/0					0	0														3.0
41	Biology	BS	UC	MKB 1213	Molecular and cellular biology	5	2	2		5/150	3,3/50	3,3/50.0			20	30		5.0											
42		BS	ES	OBO 1212	General biology of organisms	2	3	3		2/60	1,3/20	1,3/20.0			10	10			2.0										
43		BS	UC	GOF 1214	Genetics, ontogenesis, phylogeny	2	3	3		2/60	1,3/20	1,3/20.0			10	10			2.0										
44		BS	UC	UPPDOBO 2223	Educational practice in the discipline General biology of organisms	2	6			2/0					0	0					2.0								
45	General ecology and rational use of biological resources	BS	UC	EUR 2218	Ecology and sustainable	4	5	5		4/120	1,3/20		1,3/20		16	64						4.0							
46		BS	UC	Agr 3202	Agrometeorology	5	7	7		5/150	1,3/20	2/30.0			20	80								5.0						
47		BS	ES	Poch 3219	Soil science	5	8	8		5/150	1,3/20	2/30.0			20	80									5.0					
48	Mechanization and chemicalization in crop production	BS	UC	ZSK 3220	Crop protection	5	8	8		5/150	1,3/20	2/30.0			20	80									5.0					
49		BS	ES	MSH 3222	Machinary in agriculture	5	8	8		5/150	1,3/20		2/30		20	80									5.0					
50		BS	ES	Agr 3221	Agroshemistry	5	9	9		5/150	1,3/20	2/30.0			20	80										5.0				
51	Agriculture and production of goods of plant-grower	AS	ES	OSPK 3305	Basics seed studies of field crops	5	9	9		5/150	1,3/20	2/30.0			20	80										5.0				
52		AS	UC	Zem 3301	Agriculture	10	9	9	9	10/300	2,7/40	4/60.0			40	160										10.0				
53		AS	UC	PP 3302	Work practice	5	9			5/0					0	0										5.0				
54		AS	ES	SSSK 4306	Selection and seed production of agricultural crops	5	10	10		5/150	1,3/20	2/30.0			20	80											5.0			
55		AS	UC	PP 4303	Work practice	7	10			7/0					0	0											7.0			
56		AS	UC	Ras 4310	plants	10	11	11	11	10/300	2,7/40	4/60.0			40	160												10.0		
Additional modules beyond qualification																													
Modules of choice																													
Scientifically research																													
Weekly average workload at hours																57	60	63	18	45	36	60	45	75	48	72	24		
	1	General education subjects(GER)		44		13	0	1320	160	50	500	0	172	438		19	7	11	1	1	5	0	0	0	0	0	0		
		Core subjects(GER/CS)		39		12	0	1170	140	50	470	0	152	358		19	7	6	1	1	5	0	0	0	0	0	0		
		University component(GER/UC)		5		1	0	150	20	0	30	0	20	80		0	0	5	0	0	0	0	0	0	0	0	0		
		Electives(GER/ES)		0		0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		
	2	Base requirements(BS)		97		27	0	2850	520	370	270	0	396	1294		0	13	10	5	14	7	20	15	5	4	4	0		
		Core subjects(BS/CS)		0		0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		
		University component(BS/UC)		44		13	0	1260	290	220	100	0	182	468		0	11	8	0	4	7	5	5	0	4	0	0		
		Electives(BS/ES)		53		14	0	1590	230	150	170	0	214	826		0	2	2	5	10	0	15	10	5	0	4	0		
	3	Profession requirements(VRS)		60		7	2	1350	180	270	0	0	180	720		0	0	0	0	0	0	0	0	20	12	20	8		
		Core subjects(VRS/CS)		0		0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		
		University component(VRS/UC)		35		2	2	600	80	120	0	0	80	320		0	0	0	0	0	0	0	0	15	7	10	3		
		Electives(VRS/ES)		25		5	0	750	100	150	0	0	100	400		0	0	0	0	0	0	0	0	5	5	10	5		
Total on curriculum				201			0	3510	470	350	640	0	466	1584		19	9	8	6	11	5	15	10	10	5	14	5		

4	Additional courses		Number of credits	Semester	Number of hours	Number of weeks
4.1	Modules of professional practice, which includes					
	Pre-graduation practice		3	12	90	3
	Practical training		2	6	60	2
	Work practice		12	9, 10	360	12
	Total on practice		17		510	17.0
4.2	Module of physical training		0		0	
	Total		17		510	17.0
5	Module of final state certification (MoFSC)	State exam of specialization	0			
		Writing and presentation of diplom work	12	12		
	Total		12			

Annex 3. Description of component of compulsory and university subjects

1. Basic information about the discipline: 385073010

Basic information about the discipline:	
1. Discipline	The Modern History of Kazakhstan
2. Credits	5
3. Course prerequisites:	School course of world history, history of Kazakhstan.
4. Course post requisites:	Cultural science, the spiritual heritage of Kazakh people, political science, philosophy, sociology, ethics, economical history of Kazakhstan. Goal of discipline is formation of student's knowledge and understanding of History of Kazakhstan course. To introduce the modern methods of studying the national history's problems. To give a full picture of the main stages and features of the historical process in Kazakhstan from ancient times to the present. Teach to seize independently historical skill, to act on seminars, to prepare scientific reports and other types of written works.
5. Competences:	demonstrate knowledge of main periods to formation an independent Kazakh statehood; correlate with the phenomena and events to historical past with the general paradigm to world-historical development a human society through a critical analysis; master the techniques of historical description and analysis to causes and consequences an events to the modern history Kazakhstan; to propose a possible solution to contemporary problems based on an analysis of historical past and reasoned information; analyze to security and importance to development the modern Kazakhstan model; to determine the practical potential of intercultural dialogue and respect for spiritual heritage; to substantiate the fundamental role of historical knowledge in the formation of Kazakhstan's identity and patriotism; to form their own civil position on priorities of mutual understanding, tolerance and democratic values of modern society.
6. Course author	Department of Kazakhstan History
7. Main literature	1.Современная история Казахстана. Учебник для студентов неисторических спец. (бакалавриата) высш. учеб. заведений / Б. Г. Аяган [и др.]. ; ред. Б. Г. Аяган ; Ин-т истории гос-ва М-ва образования и науки РК. – Алматы: Раритет, 2010, 2.Аминов Т.М. Современная история Казахстана. Учебное пособие. Алматы., 2017 г. 3.Назарбаев Н.А. Эра независимости.- Алматы: ҚАЗақ-парат, 2017. 4.Нуртазина Р.А. Национальная безопасность Республики Казахстан: учеб.пособие.- Алматы: Бастау, 2014 5.Ертлесова Ж. Реформы 90-х: интервью с ключевыми участниками событий. - Алматы, Атамұра. - 2016.
8. Content of the discipline. Introduction to discipline; Kazakhstan on way to Independence stages of the formation to idea of a national state; Civil and political confrontation; The implementation to Soviet model of state construction; Contradictions and consequences to Soviet reforms in Kazakhstan; "Restructuring" in Kazakhstan; Kazakhstan economic development model; Social modernization – the basis to welfare of society; Ethno-demographic processes and the strengthening to inter-ethnic harmony; Social and political development prospects and spiritual modernization; The policy of	

forming a new historical consciousness of the people to the Great Steppe; Kazakhstan is a state recognized by the modern world; N.A. Nazarbayev - a person in history; Formation of a united future nation.	
Basic information about the discipline:	
1. Discipline	Philosophy
2. Credits	5
3. Course prerequisites:	Sociology, political science, culturology, psychology, contemporary history of Kazakhstan
4. Course post requisites:	History and philosophy of science, modern philosophy of society
5. Competences:	Students will be able to develop the concepts of openness, original national identity, national consciousness, spiritual renewal, competitiveness, realism and pragmatism, critical thinking, aspiration for knowledge, the acquisition of justice, honesty, freedom and other world outlook concepts as well as tolerance values, strengthening and developing culture of intercultural dialogue and peaceful life.
6. Course author	Department of Philosophy
7. Main literature	1. Johnston D. "The Philosopher's short stories. From Socrates to Derrida. "Scientific ed. Nurysheva G.Zh. - Astana, 2018. - 216 p. 2. Hess R. "Selected 25 Books of Philosophy". Scientific Ed. Raev DS - Astana, 2018.-360 h. 3. Кенни Э. "The new Western philosophy. Volume 1: Antiquity Philosophy »/ Scientific Editor Moldabekov Zh. J - Astana, 2018. - 408 h. 4. Kenny E. "The new Western philosophy. Volume 2: Medieval Philosophy "/ Scientific editor Ospanov S. - Astana, 2018. - 400 s.
5. Content of the discipline. The emergence and development of philosophy. Basics of philosophical understanding of the world. Consciousness, soul and language. Being. Ontology and metaphysics. Human philosophy and value world. «Máńgilik El» and «Rýhanı jańǵyrý» - a new philosophy in Kazakhstan.	
Basic information about the discipline:	
1. Discipline	Foreign language
2. Credits	10
3. Course prerequisites:	Foreign language school course
4. Course post requisites:	Professionally-oriented foreign language
5. Competences:	As a result of mastering the program, the student, depending on the level of training, reaches the level B1- (IELTS 4.0-5.0) or B2- (IELTS5.5-6.0) at the time of completion of the course
6. Course author	Department of Foreign Languages
7. Main literature	1. Julie Lachance ((July 21, 2015). *Practice Makes Perfect Premium: Basic English.* McGraw-Hill Education; 2 edition 2. Chris Lele. (March 20, 2018) *The Vocabulary Builder Workbook: Simple Lessons and Activities to Teach Yourself.* Zephyros Press; Workbook edition 3. Deborah Capras (01 Jan 2015). *Small Talk : B1+*. HarperCollins Publishers

	4. Mark Hancock (27 Apr 2017). *English Pronunciation in Use* Intermediate Book with Answers and Downloadable Audio. Cambridge University Press 5. Katie Foufouti (28 Dec 2017). O*xford Skills World: Level 4: Reading with Writing* Student Book / Workbook. Oxford University Press 6. Herbert Puchta, Jeff Stranks, Peter Lewis-Jones (31 Oct 2015). *Think* (SB+audio, WB+audio, TB, Tests – levels 1, 2, 3, 4). Cambridge University Press 7. British National Corpus: http://www.natcorp.ox.ac.uk 8. The Corpus of Contemporary American English (COCA): http://www.americancorpus.
8. Content of the discipline. The course program is designed for the volume of teaching - 300 hours, of which: 90 hours - for classroom work and 180 hours - for independent work. The course ends with a comprehensive exam. The course is designed for 2 semesters. - Vocabulary up to 3000 words: Active vocabulary-1200-1500 words, passive vocabulary 1500-1800 words. - Reading: Formation of reading skills with an almost complete understanding is authentic, without special vocabulary with 10% of unfamiliar words. - Writing: Formation of the ability to write a note, a private letter, a greeting card, a questionnaire, a form, a customs declaration, a plan of the report (more than 20 sentences without a dictionary). - Listening: Formation of the ability to listen to authentic messages up to 2 minutes with an understanding of the plot and the point of view of the speaker. - Speaking: Formation of the ability of oral communication lasting 2-3 minutes in a monologue and the ability to participate in spontaneous dialogue (10-15 phrases).	
Basic information about the discipline:	
1. Discipline	Kazakh (Russian) language
2. Credits	10
3. Course prerequisites:	Basic school programs of the Kazakh language
4. Course post requisites:	Basic and major disciplines of the educational program
5. Competences:	Should know: language and speech means, vocabulary, grammatical system. To be able to: correctly choose and use language and speech means based on a full understanding of the vocabulary, grammatical system of knowledge and the pragmatic content of intentions; transfer the exact content of the text, be able to formulate conclusions, explain textual information, disclose stylistic and genre features of social, cultural, socio-political, educational and professional texts; request and report information in accordance with the communication situation, evaluate the actions of the participants in speech communication, use the information to influence a familiar or unfamiliar interlocutor. Have the skill to discuss ethical, cultural, and socially significant problems in discussions, be able to express one's point of view, substantiate it, critically evaluate the opinions of participants; to fulfill personal needs (domestic, educational, social, cultural, professional), to be able to participate in various communication situations with the aim of expressing an ethically correct, from the content point of view complete, at

	the proper lexico-grammatical and pragmatic level of their position.
6. Course author	Department of Kazakh and Russian (Zhusupova A.E., Aldabergenova A.S., Imanberdieva S.K.).
7. Main literature	Альбекова А.Ш., Омарова Г.Т. Русский язык: учебное пособие для биологических специальностей. – Астана: Издательство КАТУ им.С.Сейфулина, 2016. – 150 с. Мухамадиев Х.С. Пособие по научному стилю речи. Русский язык. –Алматы: Казак университеты, 2009. Шаяхметова Н.К. Русский язык. Обучение научному стилю:учебное пособие для студентов вузов. Алматы: 2007.-189 с. Валиханова Р.Е., Савчиц Н.Е. Тексты и задания по русскому языку для самостоятельной работы студентов аграрных вузов. Научный стиль речи: Учебное пособие для студентов аграрных вузов- Алматы, 2011.- 104 стр.
8. Content of the discipline. Studying the discipline provides high-quality mastering of the Kazakh language as a means of social, intercultural, professional communication through the formation of communicative competences at all levels of language use.	
Basic information about the discipline:	
1. Discipline	Information and communication technology
2. Credits	5
3. Course prerequisites:	Mathematics, physics
4. Course post requisites:	Computer graphics, operating systems, computer networks, database theory.
5. Competences:	As a result of studying this discipline, students will be able to: - design and create simple websites; - to process vector and raster images; - create multimedia presentations; - use different social platforms for communication; - use various forms of e-learning to expand professional knowledge; - use various cloud services.
6. Course author	Department of Information and communication technologies
7. Main literature	1. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-03-4 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan). 2. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-04-1 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan).

	3. Urmashev B.A. Information and communication technology: Textbook / B.A. Urmashev. – Almaty, 2016. - 410 p., ISBN 978-601-7940-02-7 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan). 4. Нурпеисова Т.Б., Кайдаш И.Н. ИКТ. Учебное пособие / Алматы, изд-во Бастау, 2017, 183 с. 5. Nurpeisova T.B., Kaidash I.N. ICT, Almaty, Bastau, 2017. 241 p.
8. Content of the discipline. The role of ICT in key sectors of social development. ICT standards. Introduction to computer systems. Computer systems architecture. Software. Operating Systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and telecommunications. Cybersecurity Internet technologies. Cloud and mobile technologies. Multimedia technology. Smart technology. E-technology. E-business. E-learning. E-government. Information technology in the professional field. Industrial ICT. ICT development prospects.	
Basic information about the discipline:	
1. Discipline	Sociology, Political science
2. Credits	4
3. Course prerequisites:	Basic School Knowledge
4. Course post requisites:	Philosophy, History and Philosophy of Science
5. Competences:	Formation of the ability of a critical understanding of the system of interpersonal relations in society, awareness of the nature of society, the system of its groups and institutions. Formation of the socio-humanitarian outlook as the basis for the modernization of public consciousness through knowledge of the laws and laws of world politics and modern political processes, as well as the formation of national and civic identity.
6. Course author	Department of Philosophy
7. Main literature	1. “Sociology. Fundamentals of the general theory: a textbook "/ Ed. G.V. Osipov, L.N. Moskvichev. - 2nd ed., Corr. and add. - M.: Norma, 2015. - 912 p. 2. Macionis J. Society: The Basics. Pearson, 2016. (Masionis J.. Sociétti: The Biseix. Parson, 2016.) 3. J. Ritzer, J. Stepnicki. "Yleumettanu theories". - Almaty: “ŧltyқ dudarma burosy” қ Goғamdy қory, 2018. - 856 p. 4.Heywood A. Politics. - N.-Y .: Palgrave Macmillan, 2013. (Heyud Hey. Politics. - En. - Wai .: Palgrayv Macmillan, 2013)
8. Content of the discipline. Sociology in understanding the social world. Introduction to the theory of sociology. Sociological research. Social structure and stratification of society. Socialization and identity. Social change: the latest sociological debate. Political science as a science and academic discipline. The main stages of the formation and development of political science. Politics in the system of public life. Political power: the essence and mechanism of implementation. World politics and modern international relations.	
Basic information about the discipline:	
1. Discipline	Culturology and psychology
2. Credits	4
3. Course prerequisites:	Basic School Knowledge
4. Course post requisites:	Philosophy, History and Philosophy of Science

5. Competences:	Development of the social and humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, the ability to analyze and evaluate cultural situations based on an understanding of the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication. Increase of the general psychological culture, mastering the knowledge of the socio-psychological patterns of individual behavior in interpersonal communication necessary for the modernization of consciousness in accordance with the challenges of the time in the context of the program of the Spiritual Revival of Kazakhstan Leader of the Nation N.A. Nazarbayev.
6. Course author	Department of Philosophy
7. Main literature	1. Schultz D. «The history of modern psychology» / Д. Schultz, S. E. Schulz; aud B. K The poet. - 11th. - Astana: Public Fund "National Translation Bureau", 2018. - 447. 2.Mayers D. «Social Psychology» / Д. G. Mayers, J. M. Featherweight aud G. K Aikynbaeva. - 12th. - Astana: Public Fund "National Translation Bureau", 2018. – 559. 3. Gabitov TK History of Kazakh Culture: Study Guide. - Almaty: Kazakh University, 2016.
8. Content of the discipline. The morphology of culture. The language of culture. Culture of nomads of Kazakhstan. Cultural heritage of the Turks. The formation of the Kazakh culture. Personality in the context of the formation of national consciousness in psychology. Interpersonal communication as a factor in the development of a harmonious personality of Kazakhstan. Technology effective interpersonal communication as the basis for the modernization of public consciousness.	
Basic information about the discipline:	
1. Discipline	Inorganic and organic chemistry
2. Credits	5
3. Course prerequisites:	Basic school knowledge in chemistry
4. Course post requisites:	Plant physiology and biochemistry, Agrochemistry, Agricultural biotechnology, Soil science, Crop protection.
5. Competences:	Should know: theory of the properties of elements and substances; the main classes of chemical compounds and their properties; methods for qualitative and quantitative analysis. To be able to: calculate the pH of the aqueous solutions of acids, alkalis, salts, buffer solutions; prepare solutions of specified concentrations; to determine various substances in biological, agricultural and other environmental objects by analytical methods; have skill: chemical analysis in agronomic and biochemical studies, as well as in studies on the content of nutrients in fertilizers, agrochemical indicators of the soil and environmental monitoring.
6. Course author	Department of Physics and Chemistry (S.Zh. Kudaibergenova, G.M. Nurgazina).
7. Main literature	Lee M.L. "Innovative Workshop on Organic Chemistry", ed. Schelkunova A.V. Uch.posobie. Karaganda, 2005 Akhmetov N.S. General and inorganic chemistry. - M .: Higher

	School, 2004 Akhatova Z.S. Organic chemistry. –Almaty, 2014. Trav V.F. Organic chemistry. M. 2004.
8. Content of the discipline. The subject of chemistry, the laws of chemistry and basic concepts. The structure of the atom. Periodic system and electronic configurations of elements. Spatial structures of molecules and ions. Chemical kinetics. The activation energy of chemical reactions. Reversible reactions. Solutions. Theory of electrolytic dissociation. Ionic reactions. The pH of the solution is pH. Hydrolysis of salts. Solubility and solubility product. Redox Reactions. Complex compounds.	
Basic information about the discipline:	
1. Discipline	Biology
2. Credits	5
3. Course prerequisites:	Basic school knowledge in biology
4. Course post requisites:	Microbiology, plant physiology and biochemistry, plant systematics, botany, Agricultural biotechnology, Agrometeorology, Ecology and the WCO, Crop protection. Herbology, Agriculture, Crop production, Horticulture, Forage production.
5. Competences:	Should know: structural features, significance, origin, location and distinctive features of the cellular structure of the tissues of the plant organism; the structure and importance of the vegetative and reproductive organs of plants; distinctive features of plant departments and biological features of their most important representatives; characteristic of angiosperm families that are widely distributed and significant in Kazakhstan; features of flora and vegetation of Kazakhstan. To be able to: describe and analyze the structure of the vegetative and reproductive organs of plants; identify plant species based on a set of diagnostic features; determine the species structure and state of phytocenoses. Have the skill to possession of methods of morphological analysis of plants.
6. Course author	Department of Biological Sciences (Muranets A.P., Aidarkhanov, G.S., Asilkhanova R.Z.).
7. Main literature	Барабанов Е.И. Ботаника: учебник для студ. высш. учеб. заведений / Е.И. Барабанов, С.Г. Зайчикова. – М.: Издательский центр «Академия», 2006. – С. 185-377 Яковлев Г.П., Челомбитько В.А. Ботаника. – М: «Высшая школа», 2003. – С. 182-232, 359-526 Долгачева В.С. Ботаника / В.С. Долгачева, Е.М. Алексахина: учебник. – М.: Издательский центр «Академия», 2003. Б.М.Силыбаева., Ж.К.Байғана.,Н.Ш.Карипбаева. Жоғары сатыдағы өсімдіктер систематикасы. Оқу құралы. Алматы,2012.
8. Content of the discipline. Basics of cytology and histology of plant organisms. The structure of the vegetative and generative organs of plants. Morphology and anatomy of the root, stem and leaf. Reproduction. Vegetative, asexual and sexual reproduction and their biological significance. Breeding types; features alternating asexual and sexual generations of plants. Basics of systematics of lower, higher spore-shaped gymnosperms and flowering plants. Department Angiospermous plants. Distinguishing signs of the classes Dicotyledonous and Monocotyledonous, characteristic of families	

and their most important representatives. Phytocenology. The concept of phytocenosis. Agrophytocenosis. The concept of flora and vegetation. Elements of plant ecology phytogeography and geobotany.	
Basic information about the discipline:	
1. Discipline	Plant physiology and biochemistry
2. Credits	5
3. Course prerequisites:	Biology, Inorganic and Organic Chemistry, Microbiology, Systematics of plants
4. Course post requisites:	Agricultural biotechnology, Agrometeorology, Ecology and life safety protection, Crop protection. Herbology, Agriculture, Crop production, Horticulture, Forage production, Technology of storage and processing of crop products.
5. Competences:	Should know: general patterns of plant activity and their dependence on environmental conditions; chemical composition of plants, properties and exchange of the main chemical components of cells, their biological and energy value; physiological and biochemical features of crop production; mechanisms of plant resistance to cold, frost, drought, toxic gases, salinization, pesticides, radioactive radiation, biotic factors. To be able to: explain and predict the course of physiological and biochemical processes depending on environmental conditions; manage the life processes of plants; determine the viability of plant tissues when exposed to various factors. Have the skill in physiological and biochemical studies; ways to increase plant resistance to adverse environmental conditions.
6. Course author	Department of Biological Sciences (Dzhaksylykova A.K., Mamirova N.A., Alzhapparov Zh.K.).
7. Main literature	Альжанова Р.М.Физиология растений. Учебник, 2005. Альжанова Р.М.,Джаксылыкова А.К., Зотиков В.И., Баймуканов Ш.К. Практикум по физиологии и биохимии растений. Астана, КазАТУ им. С.Сейфуллина, 2009. Красильникова Л. Биохимия растений. Астана.2004. Әбдіқалықова Ә.Ә., Керімбек Ж.С., Омаров Г.С.Өсімдіктер физиологиясының практикумы. Алматы, 2012. Полевой В.В. Физиология растений. Москва «Высшая школа», 2001
8. Content of the discipline. Introduction Goals and objectives, the subject and methods of study, history. Plant cell physiology. Metabolism and the role of enzymes in it. ATP is a way of education and use. Vitamins. Synthesis and breakdown of proteins, carbohydrates and lipids. Breath of plants. Water regime of various ecological groups of plants: hygrophytes, mesophytes, xerophytes. Adaptations of plants for water extraction. Carbon nutrition of plants. Photosynthesis. The influence of external conditions on the intensity of photosynthesis of aquatic plants. Root plant nutrition. Methods of studying mineral nutrition. Growth and development of plants. Physiological basis of plant resistance. The relationship and regulation of physiological processes in the plant. . General concept of plant biochemistry. Biochemistry of plant cells. Biochemistry of nutrient accumulation of cereals. Adaptation and resistance of plants to adverse factors. Biochemistry of crop formation.	
Basic information about the discipline:	

1. Discipline	Soil science
2. Credits	5
3. Course prerequisites:	Biology, Microbiology, Inorganic and Organic Chemistry, Agrometeorology
4. Course post requisites:	Agrochemistry, Agricultural mechanization, Crop protection. Herbology, Agriculture, Crop production, Horticulture, Forage production.
5. Competences:	Should know: the characteristics of the agronomically valuable properties of the soils of the regions of Kazakhstan and methods for their assessment, the optimal parameters of soil regimes for the preservation and expanded reproduction of organic matter. To be able to: determine the soil and give them the exact name according to the accepted classification; lay cuts on the ground and highlight soil contours, make cartograms, soil essays. Have the skill to develop the agro-industrial grouping of the soils of the farms and the basis for their protection from erosion.
6. Course author	Department of Agrochemistry and Soil Science (V. Chernenok, Nurmanov Erbol).
7. Main literature	Ковриго В.П. Почвоведение с основами геологии. 2000 . Вальков В.Ф.Почвоведение.Учебник. 2006 . Колесников С.И.Почвоведение с основами геологии. 2005 . Латышев Н.Н. «Морфологические признаки и основные свойства почвы». Учебное пособие. Астана, 2014 .
8. Content of the discipline. The history of the development of soil science in the CIS and Kazakhstan. The general scheme of the soil-forming process and soil formation factors. Mineralogical, particle size and chemical composition of soils. General physical and physico-mechanical properties of the soil. Soil structure, and their influence on soil fertility. The organic part of the soil and its origin. Soil colloids and soil absorption capacity. Water, air and thermal properties and soil regimes. Soil solution and redox processes and soil fertility. Genesis, nomenclature and classification of soils. Characteristics of the main types of soil in the Republic of Kazakhstan (chernozem, chestnut, saline, brown, gray-brown, gray-earth and mountain soils), and ways to increase fertility.	
Basic information about the discipline:	
1. Discipline	Agrochemistry
2. Credits	5
3. Course prerequisites:	Biology, Microbiology, Inorganic and Organic Chemistry, Agrometeorology, Soil Science, Agricultural Mechanization, Crop Protection
4. Course post requisites:	Agriculture, Crop production, Horticulture, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: the role of basic nutrients in plant life and the need for them to form a crop; agrochemical properties of soils and ways to increase soil fertility; nutrition and fertilizer features of field, fodder, vegetable, fruit crops, hayfields and pastures, methods for calculating the economic and energy efficiency of fertilizer use. To be able to: use in practice the results of agrochemical research; organize storage and use of organic, mineral and lime

	fertilizers in specific production conditions; develop and justify a system of fertilizer Annex for the economy, crop rotation, land, culture. Have the skill to use soil and vegetable diagnostics of crop nutrition; agrochemical methods of soil analysis, organic and mineral fertilizers; method of calculating the agronomic, economic and energy efficiency of fertilizer use.
6. Course author	Department of Agrochemistry and Soil Science (R. Ramazanova, A. Kashkarov)
7. Main literature	Черненок В.Г., Куришбаев А.К., Нурманов Е.Т. Практикум по агрохимии, под ред. профессора Черненок В.Г.- Астана: Изд-во КАТУ им. С. Сейфуллина, 2016. - 273 с. Агрохимия / под ред. Б.А.Ягодина. -М.:Мир, 2003.–582с. Минеев, В.Г. Агрохимия/Минеев В.Г.-М.: Колос,2004.-718 с.
8. Content of the discipline. The chemical composition of plants and the quality of the crop. Plant nutrition and methods of its regulation. Classification of mineral fertilizers, their production and use. Nitrogen, phosphate, potash, complex fertilizers, micronutrient fertilizers. Organic fertilizer. Bacterial fertilizers. Technology storage, preparation and fertilization. Ecological problems of agrochemistry. The basic principles of building a fertilizer system and its objectives. Methods for calculating doses of fertilizers. The system of Annex of fertilizers of agricultural crops in field, fodder and vegetable crop rotations. The balance of nutrients in the soil. Economic and energy assessment of fertilizer use.	
Basic information about the discipline:	
1. Discipline	Защита сельскохозяйственных культур
2. Credits	5
3. Course prerequisites:	Biology, Microbiology, Inorganic and Organic Chemistry, Agrometeorology, Soil Science
4. Course post requisites:	Agriculture, Crop production, Horticulture, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: plant diseases, especially the development cycle of plant disease pathogens; species composition of crop pests. To be able to: justification of measures to combat plant diseases, the use of modern methods and means of pest control. Use methods of plant protection and their use in agricultural cultures. Have the skill to identify and develop systems of measures to monitor and optimize the phytosanitary condition of crops of crops, the definition of types of damage to plants.
6. Course author	Department of Plant Protection and Quarantine (B. Sadykov, PhD, Associate Professor, T. Turganbaev, Candidate of Agricultural Sciences, Associate Professor, R. Sarmanova, Candidate of Agricultural Sciences, Senior teacher)
7. Main literature	Груздев Г.С. Химическая защита растений. Учебник - М.: Агропромиздат, 1987. Попкова К.В. Общая фитопатология. Учебник. М.: Дрофа 2005 Семенкова И.Г. Фитопатология. Уч.пос. М.: МГУЛ, 2004. Чулкина В.А. Интегрированная защита растений. Уч. 2009 г.
8. Content of the discipline. Classification of methods to combat harmful and especially dangerous	

pests that damage agricultural crops. Agrotechnical method of struggle. Biological method of struggle. Mechanical method of struggle. Physical method of struggle. Chemical and other methods of control. Quarantine plants. Chemical plant protection.	
Basic information about the discipline:	
1. Discipline	Agricultural mechanization
2. Credits	4
3. Course prerequisites:	Biology, Microbiology
4. Course post requisites:	Agrochemistry, Crop protection. Herbology, Farming, Crop production, Fruit and vegetable growing, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: purpose, general structure, principle of operation and basic technical characteristics of the basic models of tractors and automobiles, purpose, general structure, principle of operation, preparation for work and assessment of the quality of the basic models of agricultural machines. To be able to: organize work and evaluate the quality of work of machines and units, determine the needs for mechanization tools, labor and maintenance materials, know the principles of construction and operation of technical equipment used in the production of plant products; use modern agricultural machinery and equipment of domestic and foreign production; to draw up a technological map of the cultivation of agricultural crops, to calculate the need of the farm for seeds, fertilizers, pesticides, fuel and lubricants, agricultural machines, tools and equipment, and labor resources; adjust agricultural machines and equipment (seeders, plows, cultivators, combines, etc.), set the seeding rate of agricultural crops, fertilizers, pesticides, etc.; assess the quality of field work performed (tillage, planting, planting, cleaning and others). Have the skill to acquisition, planning and organization of the use of aggregates and machine and tractor fleet; be able to choose energy and technical means, prepare them for work.
6. Course author	Department of Agrarian Technology and Technology (Shakhanov Asankhan Andakulovich, Prikhodko Alexander Yeremeyevich, Kaspakov Yesen Zhaksylykovich, Tolegenov Talgat Konysbaevich).
7. Main literature	System of technologies and machines for cultivation of agricultural crops in the conditions of Northern Kazakhstan. – Kostanay.: Tselinniks, 2008. Tarasenko A. P. et al. Mechanization and electrification of agricultural production. M,: Kolos, 2004 Halansky V. M., Gorbachev I. V. Agricultural machines-Moscow: Koloss, 2004. Vereshchagin et al. Organization and technology of mechanized works in crop production. - M.: Academy, 2003. Karpenko A. N., khalansky V. M. Agricultural machines, Moscow: Agropromizdat, 1989.
8. Content of the discipline. Technological basis of crop mechanization. Machines and work items for basic and surface tillage. Machines for planting and planting crops. Combined parts and machines. Machines with active working bodies. Machines for Annex, preparation of feed, protection of plants	

from pests and diseases of fertilizers, for planting, cultivation, harvesting and storage of agricultural crops. Machines, units, complexes after harvesting and storage of the crop. Reclamation and irrigation machines.	
Basic information about the discipline:	
1. Discipline	Ecology and life safety basics
2. Credits	5
3. Course prerequisites:	Biology, Microbiology, Agrometerology
4. Course post requisites:	Agrochemistry, Crop protection. Herbology, Agriculture, Crop production, Horticulture, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: fundamental concepts of general ecology and basic environmental laws; modern global and local environmental problems; sources of environmental pollution; mechanisms of exposure to pollutants, adverse mechanical and physical factors on ecosystems. To be able to: it is logical and consistent to disclose the nature and causes of environmental problems, to predict the development of adverse environmental processes. Have the skill to formulate prescriptions and prohibitions of an ecological nature, to carry out monitoring of life-supporting environments.
6. Course author	Department of Ecology (Ismailova A.A., Doctor of Medical Sciences, Professor)
7. Main literature	Ecology and sustainable development. Masenov K. B., Didenko S. V. Textbook. Astana, 2012 Denisov V. V. Ecology /Edited by V. V. Denisov. Rostov-on-don: March, 2002. 211s. Madumarova J. K. Educational and methodical complex on the discipline Ecology and OBZHD. KazATU, Astana 2007. 224c.
8. Content of the discipline. Fundamentals of ecology and a brief overview of its development. Ecosystem and environmental factors. Population as an element of the ecosystem. Biosphere and modern noosphere. Global environmental problems of our time. Social and environmental problems of our time. Environmental protection and rational use of natural resources. Organizational basics of life safety. Technosphere and production safety. Industrial, fire, radiation and chemical safety. Emergency situations of peacetime. Emergency situations in wartime threat. The role of civil defense in ensuring life safety of the population. Ecological safety as a safety aspect.	
Basic information about the discipline:	
1. Discipline	Agrometeorology
2. Credits	5
3. Course prerequisites:	Biology, Information and Communication Technologies
4. Course post requisites:	Plant physiology and biochemistry, Soil science, Agrochemistry, Crop protection, Herbology, Agriculture, Crop production, Horticulture, Feed production, Technology of storage and processing of plant products
5. Competences:	Should know: instruments for conducting meteorological observations; methods characterizing the weather conditions of the growing season and be able to give them an estimate. To be able to: use meteorological observation devices; types and forms of meteorological information.

	To be able to use the types and forms of meteorological information in the process of agricultural production to adjust the elements of agricultural crops. Have the skill to assessment of the natural resource potential of the territory for the purposes of agricultural production; organizing and conducting field work and making management decisions in various weather conditions for the functioning of agro-ecosystems; ways to protect crops from meteorological hazards.
6. Course author	Department of Agriculture and Plant (Zhumagulov Iglik Imangalievich, Tleppaeva Aigul Aldabergenovna)
7. Main literature	ЕрмаковаЛ.Н.., ЕрмаковВ.М. Агрометеорология.– М.: Издательский центр «Академия», 2006. – 377с. Лосев А.П., Журина Л.Л. Агрометеорология М.: «Колос», 2004. Сенников В.А., Ларин Л.Г., Белолюбцев А.И., Коровина Л.Н. Практикум по агрометеорологии. М.: «КолосС», 2006. Жексенбаева Ә. «Метеорология бойынша лабороториялық практикум». Алматы. «Қазақ университеті» 2011.
8. Content of the discipline. The main methods of the object of study. The influence of meteorological factors on the development of agriculture. Basic meteorological elements and their influence on the growth and development of crops. Observations of meteorological elements, methods of their conduct. Overview of meteorological elements. Weather forecast. Agriculture unfavorable weather conditions and control methods. Agrometeorological observations, forecasts and their use in agriculture. Features of climate in Kazakhstan.	
Basic information about the discipline:	
1. Discipline	Agriculture
2. Credits	10
3. Course prerequisites:	Biology, Physiology and Biochemistry of Plants, Pedology, Crop Protection, Herbology. Agricultural mechanization.
4. Course post requisites:	Agrochemistry, Crop production, Horticulture, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: tasks, features and laws of agriculture, methods of reproduction of soil fertility and optimization of living conditions of plants; biological features, weed classification and control measures; scientific foundations of crop rotations, crop precursors, classification and organization of crop rotations; scientific foundations, methods, techniques and systems of tillage, indicators and quality assessment of the main types of field work; main types of soil erosion and protection measures; scientific foundations of farming systems. To be able to: draw up and implement in practice a system of agrotechnical and special measures to improve soil fertility and protect it from erosion; determine the species composition of weeds, map the weediness, develop and implement a system of measures to combat weeds; draw up crop rotation plans, plans for their development, give an agro-economic assessment; create and implement a rational, energy- and resource-saving tillage system, an erosion protection system, control the quality

	of tillage and other field work; develop and develop farming systems for the republic's farms. Have the skill to possession of methods of expanded reproduction of soil fertility and optimization of living conditions of plants; methods of taking into account the contamination of crops and the development of a system of measures to combat weeds, - the skills to develop the optimal structure of sown areas, draw up schemes for crop rotation, determine their number and take measures for their introduction and development; methods of energy-saving soil treatment systems in crop rotation; method of improving the basic elements of farming systems.
6. Course author	Department of Agriculture and Plant Industry (Karipov Rinat Khaziyevich, Amralin Askar Uralovich, Tleppaeva Aygul Aldabergenovna, Begalina Almagul Abulkhayrovna)
7. Main literature	Gudz V. P, Primak I. D., etc. Adaptive agriculture: a Textbook - M.: Center of educational l-ry, 2007 - 334 p. Karipov R. H., Zhumagulov I. I. Agriculture. Textbook, - Astana: Katu publishing house named After S. Seifullin, 2016-275c. Ivannikov A. V., Shramko N. V., Mukazhanov K .M. Agriculture Of Northern Kazakhstan. The textbook under the editorship of Assoc. Ivannikova A .In .- Astana: publishing house of Agricultural University, 2004 296 p Karipov R. X Fundamentals of agriculture.- Astana, 2012. - 275s. Karipov R. H. Practicum on agriculture-Astana, 2002 -238 p.
8. Content of the discipline. Agriculture is the main branch of agricultural production, its objectives and goals. Agriculture - as a science, objects and methods of research. The role of agriculture among other agronomical disciplines and its features. Farming systems, periods of development, links. The scientific basis of agriculture, the laws of agriculture, their Annex. Soil regimes, ways to regulate them in agriculture. Soil erosion, species, harmfulness, pattern of development, distribution zones in Kazakhstan, control measures. Scientific basis of crop rotation, the causes of crop rotation. The role of vapors and intermediate crops in crop rotation, zones of their Annex in the republic, principles of drawing up schemes of crop rotation in accordance with modern requirements. Classification of crop rotations. Zonal features of crop rotations. Introduction and development of crop rotations. Scientific basis of tillage, goals and objectives. Technological operations and technological properties of the soil, their impact on the quality of tillage. Methods and methods of the main, pre-sowing, post-sowing and special methods of tillage, equipment and carrying tools. Features of the treatment system for vapors and lands subject to soil erosion. Zero, minimal and speed tillage. Agronomic and economic assessment of the quality of tillage.	
Basic information about the discipline:	
1. Discipline	Plant production
2. Credits	10
3. Course prerequisites:	Biology, Physiology and Biochemistry of Plants, Pedology, Crop Protection, Herbology. Agricultural mechanization. Agrochemistry, Agriculture.
4. Course post requisites:	Horticulture, Forage production, Technology of storage and processing of crop products
5. Competences:	Should know: main trends and directions of development of

	crop production; theoretical foundations of obtaining high and environmentally friendly yields, national economic importance, classification and systematics of field crops, their morphological and biological features, requirements for growing conditions; ways to improve the quality of crop production and requirements for its performance; modern energy and resource saving technologies of cultivation of field crops; organization of production processes in the cultivation of field crops; methods of harvesting and methods of reducing losses during its implementation, methods of post-harvest processing of the crop, storage and processing of products. To be able to: develop and put into practice modern technologies of cultivation of field crops, taking into account the soil and climatic conditions and material and technical equipment of farms; put into practice methods of programming and harvest management; to carry out biological and agronomical control over the formation of the crop; determine the sowing qualities of seeds and prepare them for sowing; identify and analyze the crop structure of various agricultural plants; carry out an economic and energy assessment of the production of field crops. Have the skill to possession of methodological approaches to the development of modern technologies of cultivation of field crops.
6. Course author	Department of Agriculture and Plant (Shestakova Nina Adamovna, Amantaev Bekzak Omirzakovich, Kipshakbayeva Asemgul Amangeldinovna, Arinov Bauyrzhan Kenzhebaevich)
7. Main literature	Arinov Street, Shestakova N. A. Crop Production In Northern Kazakhstan. Astana, 2009. Ul. Arinov, D. M. N., Shestakova N. A., Serekpaeva N. A., Apushevoy S. K. Plant, Astana, "Folio" 2016 G. Arinov, Mozhaev N. I., Shestakova N. A., Iskakov N. A., Serekpaev N. A. practical training on crop production.Kazakh agrotechnical University named after S. Seifullin, 2014. from 325.
8. Content of the discipline. Plant production is the most important agronomic discipline, the main branch of agricultural production. Biology is the theoretical basis of crop production. Ecological and economic principles of placement of the main field crops in the Republic of Kazakhstan. Seed material - one of the main means of production in crop production. Cereals. The value of spring and winter grain in increasing the production of grain. Morphological structure, biological features, technology of cultivation and harvesting. The main areas of grain production. Cereals and their importance in increasing the production of vegetable protein. Biological features, technology of cultivation and features of harvesting legumes. Root crops, tubers and melons, their significance, distribution, biological features and technology of cultivation. The value and use of oilseeds and essential oil crops in agriculture. Morphological features and growing technology. Spinning crops, their diversity and use. Features of biology and technology of cultivation. Tobacco and shag. Features of cultivation techniques.	

Annex 4. Description of elective disciplines
Basic information about the discipline: 385073010

Basic information about the discipline:	
1. Discipline	Fundamentals of economic theory and law
2. Credits	5
3. Course prerequisites:	School course in the history of Kazakhstan, fundamentals of law, mathematics
4. Course post requisites:	Fundamentals of agribusiness and entrepreneurship, Agrarian Economics and Statistics, Information technology in crop production
5. Competences:	Should know: theoretical foundations of a market economy; economic bases of production and enterprise resources; concepts of production costs and cost classification for the production and sale of products. To be able to: apply economic terminology, vocabulary and major economic categories. Have the skill to possess the basic provisions and methods of social, humanitarian and economic sciences in solving social and professional problems
6. Course author	Department of economic theory and law (Ovchinnikova T. V., M. E. N., Baidalina G. M. N., Muttalipovna Ph. D., associate Professor, Makei khaybar M. E. N.)
7. Main literature	Kozhakhmetova A. E.,Ovchinnikova T. V., Vidalina G. S. Foundations of economic theory: a tutorial - Astana:Katu publishing house named after S. Seifullin, 2016. - 170s. Economic theory: Textbook /Edited By N. I. Bazylev.- Moscow: INFRA-M, 2011. - 662 p. Economic theory: Textbook / under the General editorship of G. P. Zhuravleva, L. S. Tarasevich. - Moscow: INFRA-M, 2011. - 714 p. Economic theory: Textbook / ed. by V. D. Kamaev, E. I. Lobacheva. - Moscow: yurayt-Izdat, 2010. - 557s. Economic theory: Textbook /Edited By V. I. Vidyapin, Moscow: INFRA-M, 2011, 714 p.
8. Content of the discipline. Subject of economic theory and research methods. Fundamentals of social production and forms of social economy. Mechanism of functioning of the market system. Production, costs and income of the company. National economy. Economic growth and instability of the market economy. Inflation and unemployment are manifestations of economic instability. Financial and monetary system in the national economy and economic security. Fundamentals of the theory of state and law. Fundamentals of constitutional, administrative, civil, labor, family, and criminal law. Economic and legal aspects of land market regulation.	
Basic information about the discipline:	
1. Name of the discipline	Professional foreign language
2. Number of credits	6
3. Prerequisites:	Foreign language
4. Post requisites:	Professional-oriented foreign language
5. Competences:	Know: a foreign language in the volume necessary for the possibility of obtaining professional information from foreign sources; a lexical minimum of 4000 educational lexical units of a General and terminological nature; grammar of a foreign language; history and culture of the country of the

	foreign language being studied; rules of speech etiquette; be able to: read original literature on the specialty in a foreign language to obtain the necessary information; use knowledge of a foreign language in professional activities; have the following skills: presentation in a foreign language in the volume necessary to obtain information from foreign sources; written argumentative presentation of one's own point of view; public speech, conducting discussions and polemics.
6. Course author	Department of foreign language (Shataeva. G. K, Samatanova. a. R)
7. Primary literature	Nogaev Adilbek Aleksandrovich educational and methodological complex of the discipline "professionally oriented foreign language" for bachelors in the specialty 5B080100 - "agronomy" reflects all the necessary topics and terminology for training highly qualified specialists. Astana, 2016. Irgebaeva S. T., A. A. Tuenbaeva textbook in English for multilingual groups , Almaty 2014. Zholamanov, K. educational and methodical complex of the student's discipline in the specialty 5B081100-plant Protection and quarantine in the discipline “agriculture". Almaty, 2014
8. Content of the discipline. Reading (ability to understand a written message using various types of reading); Listening (ability to understand an oral message of a monological and dialogical nature); Speaking (ability to convey information to the interlocutor and adequately understand the message); Writing (ability to convey the necessary information in writing); Language course material; Phonetics (phonetic and articulatory structure of the language); Vocabulary (4000 lexical units, including common vocabulary and terminology; household, socio-cultural, professional vocabulary); Grammar (noun; pronoun; adjective; adverb; numerals; article; verb and its grammatical categories; conjunctions and prepositions); Language styles; cross-Cultural communication (culture and traditions of English-speaking countries, speech etiquette).	
Basic information about the discipline:	
1. Name of the discipline	Professional-oriented foreign language
2. Number of credits	3
3. Prerequisites:	Foreign language, Professional foreign language
4. Post requisites:	basic and profile cycle disciplines in English
5. Competences:	Know functional features of oral and written professionally-oriented texts, including scientific and technical ones, requirements for documentation (within the program), accepted in communication, Be able to: make an oral (monologue and Dialogic) speech within the scope of professional topics, independently prepare and make oral messages on professional topics, including using multimedia technologies. have the skills: in processing a given amount of information for the purpose of preparing a section of the WRC in AY (20% of the total number of sources must be in a foreign language); - expanding and deepening the knowledge of a foreign language necessary for continuing education in the master's program.
6. Course author	The Department of agriculture and plant growing(Baytulenov A. A., candidate of agricultural Sciences, senior lecturer)
7. Primary literature	Nogaev Adilbek Aleksandrovich educational and methodological complex of the discipline "professionally oriented foreign language" for bachelors in the

	specialty 5B080100 - "agronomy" reflects all the necessary topics and terminology for training highly qualified specialists. Astana, 2016. Irgebaeva S. T., A. A. Tuenbaeva textbook in English for multilingual groups , Almaty 2014. Zholamanov, K. educational and methodical complex of the student's discipline in the specialty 5B081100-plant Protection and quarantine in the discipline “agriculture". Almaty, 2014
8. Content of the discipline. Professionally-oriented foreign language. The modern concept of agronomy combines a set of Sciences about cultivating plants at the lowest cost of labor and money, increasing their productivity, improving the quality of crop production, increasing soil fertility, and rational use of agricultural land. The complex of agronomic Sciences includes: General agriculture; crop production; breeding and seed production; Agrochemistry; plant protection from pests, diseases and weeds. In this regard, these terms should be distinguished and used agronomically correctly. The lexical minimum of foreign special terms is 2000-3000 units by section. Grammar: basic parts of speech; structure of simple and complex sentences; basic models of word formation. Reading: introductory, search, studying and viewing. Dialogic and monologue speech. Development of skills in writing consistent presentation of thoughts, arguments, and information. Translation of professional texts from a foreign language into your native language. Listening of the messages and information of a professional nature.	
Basic information about the discipline:	
1. Name of the discipline	Physicolloid and analytical chemistry
2. Number of credits	5
3. Prerequisites:	School chemistry courses, inorganic and organic chemistry
4. Post requisites:	Agricultural biotechnology, Crop protection, Soil science, Agrochemistry, herbology.
5. Competences:	*have an idea:* - about the mechanisms of reactions, about the general laws of the transformation of organic compounds, their properties and ways of use, to teach future specialists to use this knowledge. *know:* - about unlimited possibilities of synthesis, transformation and establishment of the structure of organic substances *be able to:* - perform initial calculations, final calculations using statistical processing of the results of quantitative analysis; - independently carry out a chemical experiment with further generalization of the obtained results. have skills: -select the average sample, draw up an analysis scheme, conduct a qualitative and quantitative analysis of the substance within the limits of using the basic techniques and methods provided by the program.
6. Course author	Department of Physics and Chemistry: Zhokezhanova S.K., Nurgaliyev D.N.
7. Primary literature	1 Pilipenko A.G., Pyatnitsky I.V. Analytical chemistry: At 2h. M .: Chemistry, 1990. 846s. 2 Fundamentals of analytical chemistry. Tasks and questions. Ed. Academician Yu. A. Zolotov. M .: Higher. wk 2002 3 Korenman Ya. N., Lisitskaya P.P. Workshop on analytical chemistry. Voronezh: 2002. 403 p. 4 Volkova G.V., Safina R.G. Methods of expressing the concentration of

	solutions. Solving titrimetry problems: method. instructions. / Krasnoyarsk. state un-t Krasnoyarsk, 1997. 13c. 5 Sebryaeva N.S. "Physical and colloidal chemistry" for students of agricultural specialties. TMC / Astana, 2013. 171 p. 6 Sebryaeva N.S. "Physical and colloidal chemistry", Astana. 2005.
8. The content of the discipline. The basis of chemical thermodynamics. Chemical kinetics Catalysis. The principle of Le Chatelier. Solutions. Electrochemistry. Electrolytic solutions. Electrolytic ionization of water. Hydrogen indicator. Electrode potential. Standard electrode potential. Emf. Nernst equation. Surface tension. Adsorption. Adsorption isotherm. Freundlich and Langmuir equation. Gibbs energy. Traube rules. Exchange adsorption. Colloidal systems. Molecule-kinetic, optical and electrical properties of colloids. High molecular compound. Solutions (IUD). Swelling and dissolving IUD. IET. Polyelectrolytes. Coacervation. The colloidal state of soil organic matter and its properties. Microheterogeneous systems. Soil colloids.	
Basic information about the discipline:	
1. Name of the discipline	Microbiology
2. Number of credits	5
3. Prerequisites:	Biology
4. Post requisites:	Crop protection, Soil science, Agrochemistry, Forage production, Technology of storage and processing of crop products.
5. Competences:	*know:* - systematics, morphology, genetics and reproduction of bacteria; the relationship of microorganisms and the environment; the relationship of microorganisms among themselves and with other creatures; metabolism of microorganisms; - soil microorganisms and methods for determining their composition and activity; -the role of soil microorganisms in the formation and reproduction of soil fertility; on the impact of technological methods on the activity of microorganisms in the soil; -o synthetic chemical compounds and their detoxification by microorganisms; epiphytic plant microorganisms; on biological products for agricultural purposes; feed microbiology; *be able to:* - prepare preparations of microorganisms, distinguish the main forms of bacteria, carry out a quantitative account of microorganisms in various substrates, obtain accumulative and pure cultures of microorganisms, conduct qualitative reactions to the products of the metabolism of microorganisms; *own:* - methods of preparation of drugs and microscopy, methods of cultivation of microorganisms; -microbiological methods of laboratory analysis of samples of soil, plants and plant products.
6. Course author	Department of Soil Science and Agrochemistry: Nauanova Ainash Pakhuashevna
7. Primary literature	1 Tulemisova Zh.K., Kasenova G.T., Muzpbarov B. Microbiology and virology, 2010, “Nur Print”, 139 b. 2 Nauanova A.P., Aydarkulova R.S., Ishmuhanbetova G.N., Nazarova A.Zh. Guidelines for laboratory and practical classes on the subject "Microbiology". Astana KATU. 2015

	3 Tepper E.Z. Workshop on Microbiology: study guide / EZZepper, V.K. Shilnikova, G.I. Pereverzeva. -M .: Drofa, 2005. – 256 s. 4 Netrusov A.I. Workshop on microbiology: a tutorial / A.I. Netrusov, M.A.Egorova, L.M. Zakharchuk and others - Moscow: Akademiya, 2005. - 608 p.
8. The content of the discipline. Systematics, morphology and reproduction of bacteria. Genetics and selection of microorganisms. Microorganisms and the environment. Physiology, metabolism and energy of the microorganism. Food bacteria. Mechanisms. The transformation of carbon compounds by microorganisms. The main fermentation and oxidation processes. The transformation of carbon compounds by microorganisms. The main fermentation and oxidation processes. The participation of microorganisms in the cycle of nitrogen, phosphorus, iron, potassium. Soil microbiology. The effect of agricultural practices on soil microorganisms. The relationship of soil microorganisms and plants. Microbiological tillage and plant protection products. Microbiology of feed.	
Basic information about the discipline:	
1. Name of the discipline	Plant taxonomy
2. Number of credits	5
3. Prerequisites:	Biology
4. Post requisites:	Plant physiology and biochemistry, plant Genetics, Herbology, crop Production, forage Production, fruit and vegetable Production, crop Selection.
5. Competences:	Знать: основы геоботаники и флорографий, систематики растений; characteristics of the main families of the region; stages of the evolution process; be able to: distinguish between systematic forms of plants, work with a microscope, prepare anatomical preparations; identify unfamiliar plant species; determine the type of plant life form. Have the skills to: use any plant identifier; recognize the characteristics of the main families, genera, and species of plants of different types of ecosystems, and identify various representatives of systematic groups.
6. Course author	Department of biological Sciences (Aidarkhanova G. S., Asylhanova R. Z., A. P. Muranetz)
7. Primary literature	Yakovlev G. P., Chelombitko V. A. Botany. - M: "Higher school", 2003. - P. 182-232, 359-526. Dolgacheva V. S. Botany / V. S. Dolgacheva, E. M. Aleksakhina: textbook. - M.: publishing center "Academy", 2003. Universal Atlas. Biology [Text]: textbook. stipend. In 3 books.2. Viruses. Prokaryotes. Plants. Mushrooms. Slimes. Animals (comparative anatomy) / G. L. Bilich, V. A. Kryzhanovsky. - Moscow: Publishing house "ONYX 21 century", 2005. - 1136 p.
8. Content of the discipline. Main tasks of taxonomy. Differences between higher plants and lower organisms. Characteristics of bacteria. Characteristics of bacteria. Kingdom of mushrooms. Department Of Lichens. Structure, methods of reproduction, distribution. The role of lichens in soil formation. Systematics of higher plants. Classification and characteristics of Mosses. Alternation of generations. Higher spore-bearing plants(Moss, horsetail, ferns). The role of diversity in the process of evolution. Alternation of generations. Classification of gymnosperms. The developmental cycle of pine. Department Of Angiosperms. Structure of the flower. Functions of a flower. Androecium. Gynoecium. Microsporogenesis. Megasporogenesis. Types of inflorescences. Methods of pollination. Double fertilization, seed formation. Types of seeds. Formation and classification of fruits. Differences between angiosperms and gymnosperms. Classification of angiosperms. Basic system.	
Basic information about the discipline:	

1. Name of the discipline	Plant genetics
2. Number of credits	5
3. Prerequisites:	Biology, plant Systematics, Botany, plant Physiology and biochemistry.
4. Post requisites:	Crop selection, Fundamentals of field crop seed science, crop Protection, crop Production, fruit and vegetable Production, feed Production.
5. Competences:	Know: characteristics of genetics as one of the agricultural Sciences; features of genetics as a science, research methods used in genetics; laws established by G. Mendel; inheritance of traits in intraspecific hybridization; inheritance of traits in non-allelic interaction of genes; chromosomal theory of inheritance; genetic maps of chromosomes; genetic code; protein synthesis in the cell, the effect of GMOs on the human body. be able to: professionally use the knowledge gained in the field of crop and seed production; develop agrotechnical measures using the genetic basis of individual development; apply herbicides and pesticides, taking into account their mutagenic effects on plants; professionally use the knowledge gained when working with hybrid seed material. have the skills to: obtain and use hybrid material,явления гетерозиса; методикой передачи наследственной информации.
6. Course author	Department of biological Sciences (Kalachikova L. K., Aidarkulova R. S., Ospanova N. With.)
7. Primary literature	Genetics: Temporary standard program. On spec. 4501-agronomy. / I. O. Netesova. - Astana: Agricultural University named after Seifullina, 2000. Evolution of life: studies. manual for students of pedagogical universities / n. n. n. Jordan. - M.: publishing center "Academy", 2001. - 432 p. - (Higher education). Ed.Ivanova V. I. Genetics.Moscow, 2006. Zhuchenko A,A., Guskov Y. L., Puchalski B, A. Ul. Genetics 2006. Bersimbaev R. L., P. Mukhambetzhanova, Ul. Dalabayev S. Genetics . Almaty, 2006. Bersimbaev R. L., P. Mukhambetzhanova, Genetics. Almaty, 2006. Belaev.S. molecular biology and genetics, Moscow, 2008.
8. Content of the discipline. Subject of genetics. A brief history of development. Research methods in genetics. Fundamentals of cytological inheritance of the seed. Mitosis and meiosis. The basic laws of heredity of the seed. Mendel's Teaching. Di, three and policyprednisone crossing. The law of independent seed inheritance. Mnogopoliarnosti. Pleiotropy. Modification genes. Expressive and penetrant genes. Interaction of non-allelic polymer genes. Chromosomal, genetic, and genomic mutation. Population genetics. Crossover.	
Basic information about the discipline:	
1. Name of the discipline	Gerbology
2. Number of credits	5
3. Prerequisites:	Biology, plant Systematics, Botany, plant Physiology and biochemistry.
4. Post requisites:	Agricultural mechanization, crop Protection, crop Production, fruit and vegetable Production, feed Production.
5. Competences:	Know: concepts about agrophytocenoses; methods for determining weeds by seeds, seedlings, and adults; methods for determining weeds and mapping crop contamination; agrotechnical, biological, and chemical measures to control weeds; be able to: distinguish the types of weeds, their harmfulness and develop the

	most effective ways to reduce weeds; conduct quarantine measures and their impact on the number and species composition of weeds in crops. have the skills: implementation of weed control measures.
6. Course author	The Department of agriculture and plant-growing (Garipov Renat of Hozeevich, Amylin Askar Uralovich)
7. Primary literature	Карипов Р.Х. Основы гербологии.Издательство Казахского агротехнического университета им. С.Сейфуллина, 2014, С.84. Хорст Клаассен, Йоахим Фрайтаг . Сорные растения,распространение и вредоносность определение видов. Под редакцией Ю.М. Стройкова. Лимбургерхоф. БАСФ АГ, 2004, С.258. Савельев В. А. Сорные растения и меры борьбы с ними. Учебное пособие. М.: Лань. 2018, С 314. Баздырев Г.И. Сорные растения и меры борьбы с ними в современном земледелии. М.: Изд-во МСХА, 1993. - 242 с.
8. Content of the discipline. The concept of weeds and their origin. Damage caused by weeds. Thresholds of harmfulness of weeds. Agrophytocenoses of agricultural land. The biological and ecological characteristics of weeds. Vegetative propagation of perennial weeds. Classification of weeds and their mapping. Determination of seed stocks and vegetative organs. Propagation of weeds in the soil. Weed control measures. Organizational and preventive measures. Agrotechnical, biological, phytocenotic, chemical and complex weed control measures. Weed control measures in conservation agriculture.	
Basic information about the discipline:	
1. Name of the discipline	Operation of the MTP
2. Number of credits	3
3. Prerequisites:	Information and communication technologies, biology, agricultural Mechanization, Herbology
4. Post requisites:	Crop selection, Fundamentals of field crop seed science, crop Protection, crop Production, fruit and vegetable Production, feed Production.
5. Competences:	To know: the basics of operating technology of performance of works; be able to: choose the appropriate machine or tool for performing technological operations, processes; efficiently complete machine and tractor units, production lines; have the following skills: selecting machines for performing basic technological operations, completing MTA and calculating the need for material and technical means.
6. Course author	Caverta agricultural engineering and technology (shahani Asanhan Andagulova, Prikhodko Alexander eremeevicha, Kasparov Esen zhaksylykovich, Tolegenov Talgat Konysbaeva
7. Primary literature	1.Система технологий и машин для возделывания сельскохозяйственных культур в условиях Северного Казахстана. – Костанай.: ЦелинНИИМЭСХ, 2008. 2.Тарасенко А.П. и др. Механизация и электрификация сельскохозяйственного производства. М,: КолосС,2004 3. Халанский В.М., Горбачев И.В. Сельскохозяйственные машины – М.: КолосС,2004 4. Верещагин и др. Организация и технология механизированных работ в растениеводстве. –М.: Академия,2003. 5 Карпенко А.Н., Халанский В.М. Сельскохозяйственные машины. – М.: Агропромиздат,1989.

8. Content of the discipline. The organizational form of the use of technology in agriculture. Machine-tractor unit. Organizational and technological preparation of production of field mechanized works. Technology of cultivation of agricultural crops and its technical support. Harvesting and transport process in crop and vegetable production. Features of use of vehicles in conservation agriculture.	
Basic information about the discipline:	
1. Name of the discipline	Fundamentals of land management
2. Number of credits	4
3. Prerequisites:	Agrometeorology, Soil Science
4. Post requisites:	Information technologies in crop production
5. Competences:	Know:land legislation of the organization of rational use and protection of land resources; methods of technical and economic justification of on-farm land management, land protection measures; land management as a system of state measures for land use; types of basic geodetic works used for land management design; methods of designing land management works taking into account territorial features; components of the land cadastre for agroecological assessment of agricultural land and rational land use; be able to: perform basic land management work in accordance with their functional responsibilities; read and understand land management documentation;identify land use and land management objects. Have the following skills: drafting on-farm land management projects and their economic justification.
6. Course author	Department of land management (orazalinova Altynay Nurlanovna)
7. Primary literature	Уманец В.Н. Основы земельного кадастра и оценки земель. Учебное пособие. Алматы: КазНТУ, РИО. 261 с. С.Лазоренко Г., Байтеленова А.А.. Основы землеустройства. Кокшетау , 2009
8. Content of the discipline. General information about land management. Legal and economic aspects of land management. Government activities on land management. Land cadastre. Inter-farm land management. On-farm land management. Planning and high-rise justification of land plots. Engineering-geodetic and topographical surveys for land management purposes. Land management design. Drawing up a land use plan taking into account the structure of the land Fund. Construction of land management schemes taking into account the types, forms, categories of land and production features. Development of a set of measures for land management of the territory. The study of the land cadastre and the law. Study of ways to determine the area of land plots. Study of planning and cartographic documentation. Calculation of the required areas of arable land based on the planned yield per hectare and the return of fertilizers.	
Basic information about the discipline:	
1. Name of the discipline	Basics of agribusiness and entrepreneurship
2. Number of credits	5
3. Prerequisites:	Fundamentals of economic theory and law, political Science, agricultural Mechanization, soil science, Agrochemistry, operation of MTP, Fundamentals of land management, Agrometeorology, crop Production, fruit and vegetable Production, feed Production, Information technologies in crop production.
4. Post requisites:	Bachelor's degree projects (works)
5. Competences:	Know: the mechanisms of functioning of firms and enterprises of various organizational and legal forms, which are an integral part of their professional education, which will allow them to make more effective decisions when

	carrying out business activities; be able to: apply the knowledge gained to build an effective business creation system and have the competence necessary to develop arguments and solve problems in the field of study; have practical skills to organize entrepreneurship; organization of business activity and evaluation of its effectiveness.
6. Course author	Kishko N. V., Alimzhanova G. D.
7. Primary literature	Сейдахметов А.С., Елшибекова К.Ж. «Предпринимательство»: Учебное пособие. Алматы: Экономика2010. Елшібаев Р.Қ. Кәсіпкерлік қызметті ұйымдастыру. Оқуқұралы. Алматы: Экономика, 2009ж. Сейдахметов,Қ.Ж. Елшібекова, А.Қ.Ізмаханова. Кәсіпкерлік.Оқулық.ҚР Жоғарыоқуорындарыныңқауымдастығы. – Алматы.: «Экономика»,2011.
8. Content of the discipline. Agribusiness: concept, essence, main types and organizational forms. Resource support for business activities in agricultural sectors. Business planning in the agribusiness system. Features of marketing research of the agricultural market. Risks in the agricultural business. Financing in agribusiness. Leasing and factoring. HR support in business activities. The organization of the service of agribusiness. Organization of business transactions. Responsibility of agribusiness entities. Culture and ethics of entrepreneurship. Analysis and evaluation of business performance. State support for agribusiness and its infrastructure. Termination of business activity.	
Basic information about the discipline:	
1. Name of the discipline	Agricultural Economics and statistics
2. Number of credits	5
3. Prerequisites:	Fundamentals of economic theory and law, political Science, agricultural Mechanization, soil science, Agrochemistry, operation of MTP, Fundamentals of land management, Agrometeorology, crop Production, fruit and vegetable Production, feed Production, Information technologies in crop production.
4. Post requisites:	Bachelor's degree projects (works)
5. Competences:	Know: agricultural statistics of laws and regulations in the agricultural sector; be able to: use normative legal documents and theoretical knowledge in the organization of agricultural production; rationally organize production, labor of employees; use progressive forms of remuneration; analyze the state of industries and agricultural activities; analyze the state of development, formulate conclusions and forecast the prospects for the development of agricultural projects in the market. have the skill: statistical evaluation of the analysis of the agricultural sector.
6. Course author	Department of Economics (atabayeva K. K., senior lecturer, Akhmetova D. T., associate Professor)
7. Primary literature	Бельгибаева К.К. Финансово-банковская статистика/Учебное пособие – Алматы, Экономика,2010. Социально-экономическая статистика. Учебное пособие./ А.М. Елемесова, К.К. Бельгибаева, Е.М. Кийков, Г.М. Моддакулова – Алматы: Экономика,2010. Климова Н.В. Экономический анализ. – СПб.: Питер, 2010. – 192с. Дюсембаев К.Ш. Анализ финансовой отчетности: Учебное пособие. - А.: Экономика, 2009. -366с. Дюсембаев К.Ш. и др. Анализ финансового положения предприятия. : Учебное пособие. - А.: Экономика, 2007.

8. Content of the discipline. Subject and method of socio-economic statistics. Subject and method of agricultural statistics. Statistics of the land Fund. Statistics of the acreage. Statistics of perennial plantings. Statistics of agricultural activities. Crop and yield statistics. Statistics on the number and production of livestock of farm animals. Statistics of livestock production and productivity of farm animals. Fixed capital statistics. Statistics of energy and production equipment. Labor statistics. Statistics on the cost of intermediate consumption products. Statistics of gross output and marketable products. Statistics of agricultural products procurement. Price statistics.	
Basic information about the discipline:	
1. Name of the discipline	Information technologies in crop production
2. Number of credits	5
3. Prerequisites:	Fundamentals of land management, soil science, Agrochemistry, agricultural Mechanization, operation of MTP, Agrometeorology, crop Production, Biology, fruit and vegetable Production, feed Production.
4. Post requisites:	Bachelor's degree projects (works)
5. Competences:	Know: the main elements and operating principle of modern geoinformation systems for satellite monitoring and monitoring of agricultural machinery, growth and development of crops; information technologies that reduce costs and minimize the impact on the environment; electronic field maps; global positioning systems; GPS equipment; drawing up a map of soil sampling and electronic cartograms, regulating the production process of plants by micro-periods of organogenesis using self-adjusting automated tools based on electronic control systems. be able to: create electronic field maps using GIS, create electronic cartograms; identify the state of crops, determine the yield during harvesting using yield counters; have the following skills: working with electronic farm maps in GIS; maintaining databases of staff, customers, farm fields, mobile power equipment, agricultural machinery, management strategy that uses information technology; methods for mapping field contamination; assessment of spatial heterogeneity of soil cover and crops.
6. Course author	Becs Omirzakovich Amantaeva, Rausch Ramazanovoj Khamzayev, Sahow Nukusheva Orazovich, Bekmyrza Sadykov Sultanovich.
7. Primary literature	1.Личман Г.И., Марченко Н.М., Дринча В.М. Основные принципы иперспективы применения точного земледелия. М., Россельхозакадемия,2004, 80с. 2.Якушев В.П. и др. Что такое точное земледелие? СПб., АФИ, 2004, 18с. 3.Михайленко И.М., Управление системами точного земледелия. - СПб.:Изд-во С.-Петерб. ун-та, 2005. - 234 с. 4.В. П. Якушев, В. В. Якушев. Информационноеобеспечение точногоземледелия. - СПб.: Издательство ПИЯФ РАН. 2007. - с. 384.
8. Content of the discipline. Technological approaches to the introduction of precision farming in agricultural enterprises. Positioning system. Features of application of GIS in agriculture, the main functions and examples of geographic information systems. The system of parallel driving. Multifunctional display. Maneuvering device. Field mapping in the precision farming system. Conducting an agrochemical survey. Application of fertilizers in precision farming. Differentiated application of fertilizers. Plant protection in precision farming. Normalized vegetation index NDVI (Normalized Difference Vegetation Index). Application of ICT in crop production. Agronomist's tablet. Calculating the cost and payback of implementing precision farming technologies in an agricultural enterprise.	

Basic information about the discipline:	
1. Name of the discipline	Selection and seed production of agricultural crops
2. Number of credits	5
3. Prerequisites:	Biology, plant Genetics, Agricultural biotechnology, soil science, Agrochemistry, agricultural Mechanization, operation of MTP, crop Protection, Agrometeorology, crop Production, fruit and vegetable Production, feed Production.
4. Post requisites:	Bachelor's degree projects (works)
5. Competences:	Know: about modern methods of selection; the value of the source material, master breeding methods, methods of evaluating varieties, testing and introduction to production and preparation of high-quality varietal material; organization of variety testing and use; schemes and methods for obtaining elite seeds;. be able to: create a collection of source material, work and set the task of obtaining more valuable varieties, be a direct participant in the study of methods and techniques of breeding; select the source material of plants for breeding and seed production; carry out aprabotsiyu crops, fill out documents in breeding and seed production; grow elite seeds of field crops; have the skills to: select the source material, conduct selection in the hybrid generation, conduct scientific research according to the methods used in plant breeding; use the methods of haploid and cell selection, cell and chromosomal engineering to get the source material for creating new varieties and hybrids.
6. Course author	The Department of agriculture and plant growing (Kipshakbaeva Guilder Amangeldinovna, Sagalbekov Ermek U.)
7. Primary literature	Пушкин Б.И. Селекция и семеноводство сельскохозяйственных культур: учебное пособие с грифом УМО (ДРУМЦ), - Благовещенск,1998.-153с. Швидченко В.К. Селекция сельскохозяйственных растений. 2006. Коренев Г.В. Рстениводство с основами селекции и семеноводства.Уч.пособие, 1983. Сулейменов А.А. «Селекция и семеноводство» учебник. Астана, 2007 Практикум по селекции и семеноводству полевых культур. Под ред. В.В.Пыльнева.-М.: КолосС, 2008 г.
8. Content of the discipline. Variety. Source material and methods for creating it. Analytical selection. Synthetic selection. Experimental mutagenesis and its use in breeding. Polyploidy and haploidy in plant breeding.. heterosis and its use in breeding esterni. Inbreeding. Use of biotechnology in plant breeding. Methods of selection and evaluation of breeding material. Organization of the selection process. State variety testing and zoning of varieties and hybrids. Seed production. Organization of seed production of individual crops in modern conditions. Varietal and seed control in seed production of field crops. Variety exchange and variety renewal.	
Basic information about the discipline:	
1. Name of the discipline	Fundamentals of field crop seed science
2. Number of credits	5
3. Prerequisites:	Biology, plant Genetics, Agricultural biotechnology, soil science, Agrochemistry, agricultural Mechanization, MTP Operation, crop Protection, Agrometeorology,
4. Post requisites:	Crop production, fruit and vegetable Production, forage Production, Selection and seed production of agricultural crops
5. Competences:	Know: the role of seeds in increasing the yield of agricultural crops; yield and

	seed quality largely depend on the conditions of growing plants and their agricultural technology; requirements for the quality of seed material of field crops; issues of the legislative and regulatory framework for seed science, organization and control of seeds be able to: analyze and argue the results of evaluating the yield potential of a variety, batch of seeds, forecast the quality of seeds on the root, form the basis for evaluating the yield potential and the technology of sowing the analyzed seeds, acquire practical skills in determining and controlling the sowing and yield properties of seeds. to have skills: improve the quality of the seeds decreases their losses.
6. Course author	The Department of agriculture and plant growing (Shestakova Nina Adamovna, Arinov Bauyrzhan Kengebaeva.)
7. Primary literature	Смиловенко Л.А. Семеноводство с основами селекции полевых культур: учеб. пособие. – Ростов н/Д.: МарТ, 2004. - 240с. Васько В.Т. Основы семеноведения полевых культур: учебное пособие/ В.Т. Васько. - СПб.: Лань, 2012. - 304 с. Практикум по растениеводству. Можаев Н.И., Аринов К.К., ШестаковаН.А., Искаков М.А., Серекпаев Н.А. Типография АО «КазАТУ им. С.Сейфуллина», 2014. 309с.
8. Content of the discipline. The importance of seed science in the development of agricultural production. The subject and tasks of seed science, its connection with other disciplines. The process of forming, filling and maturing seeds. Post-harvest maturation, seed respiration, germination. Seed dormancy. Biological and economic durability of seeds. Influence of environmental conditions on seed quality: agricultural technology, post-harvest processing, and other reasons. Standards (GOST) for seed quality. Storage conditions and methods for improving the quality of seed material. Field germination and ways to increase it. Economic and environmental efficiency of seed material quality in agricultural production.	
Basic information about the discipline:	
1. Name of the discipline	Fruit and vegetable growing
2. Number of credits	5
3. Prerequisites:	Biology, plant Genetics, Agricultural biotechnology, soil science, Agrochemistry, agricultural Mechanization, operation of MTP, crop Protection, Agrometeorology.
4. Post requisites:	Selection and seed production of agricultural crops, Technology of storage and processing of crop products, Basics of agribusiness and entrepreneurship, bachelor's Degree projects (works)
5. Competences:	Know: ways of development of fruit growing, production-biological and morphological classification, features of growth and fruiting, technology of laying a garden, organization of a fruit nursery, pruning and forming of fruit trees; the role of vegetables in national nutrition, biological and morphological features of vegetable crops, methods of pre-sowing seed preparation, vegetable crop rotations and crop rotations, constructions of protected ground structures; be able to: distinguish fruit crops by biological and morphological characteristics, make a plan for laying a fruit garden, propagate fruit crops, prune and form the crown of fruit trees; prepare seeds for sowing, grow seedlings, calculate the area of plant nutrition, take care of vegetable crops and harvest; have the following skills: organize agrotechnical work in the orchard and in

	the fruit nursery, control the work performed, determine the quality, plan the amount of work, improve knowledge; pre-sowing seed preparation, methods of growing seedlings, sowing seeds, care of vegetable crops.
6. Course author	The Department of agriculture and plant growing (Torbakov of Ariscal Saparalieva, Zhanbyrshina nursaule Janibekova.)
7. Primary literature	Юсупов М.З., Петров Е.П., Турбекова А.С., Ахметова Ф.С., Овощеводство Казахстана.Астана.Изд-во КазАТУ им.С.Сейфуллина. 2018.- С.406. Шепетков Н.Г. Овощеводство Северного Казахстана. -Астана, Изд-во КазАТУ им.С.Сейфуллина ,2015.-С406. Шепетков Н.Г. Научные основы высокой продуктивности овощных культур. Казахстана.-Астана, Изд-во КазАТУ им.С.Сейфуллина. 2013.
8. Content of the discipline. History, meaning of fruit growing, classification morphological, biological and industrial, features of growth and fruiting of fruit plants, biological bases of their reproduction, fruit nursery, meaning and structure, technology of laying a fruit garden. Forming the crown of fruit trees, pruning, types of pruning.Features and tasks of vegetable growing, biological features of vegetable crops, vegetable crop rotations and crop rotations, seeds and methods of pre-sowing processing, methods of growing seedlings, schemes for sowing vegetable plants, agricultural equipment for growing vegetable plants, machines and tools for growing and harvesting vegetable plants.	
Basic information about the discipline:	
1. Name of the discipline	Fodder production
2. Number of credits	5
3. Prerequisites:	Biology, Microbiology, plant Systematics, plant Genetics, soil science, Agrochemistry, agricultural Mechanization, operation of MTP, crop Protection, crop Production, Agriculture, Agrometeorology.
4. Post requisites:	Selection and seed production of agricultural crops, Technology of storage and processing of crop products, Basics of agribusiness and entrepreneurship, bachelor's Degree projects (works)
5. Competences:	Know: the main types of forage plants and their economic characteristics; types of forage lands and features of their operation; systems for improving forage lands and equipment used for these activities; principles of composing grass mixtures for hay and pasture use; current care of grass stands of hayfields and pastures; physiological and biochemical processes occurring during the preparation of various types of feed-hay, silage, haylage; be able to: organize grazing (pasture turnover); organize a green conveyor in a specific farm; carry out forage harvesting for the period of stable keeping of animals; have skills: advanced technologies of forage preparation; knowledge about preparations of vitamin flour, briquetted grass cutting, cellular hay, branch silage, branch flour.
6. Course author	Department of agriculture and crop production (Serekpaev Nurlan Amangeldinovich, Stybaev Gani Zhasymbekovich, Nogaev Adilbek Aidarkhanovich.)
7. Primary literature	Можаев Н.И., Серекпаев Н.А. Кормопроизводство. Астана, 2007 г.
8. Content of the discipline. Feed production as a branch of science and agriculture, its tasks in creating a feed base. Economic and Botanical groups of forage crops.Requirements of forage grasses for moisture, heat, light, air, and soil. The renewal and otafest plants. Vegetation phases. Nutritional value of plants and their assessment by chemical composition. Palatability, digestibility and	

assimilation of herbs by domestic animals. Filetoprocess classification. Fluctuations and successions. Inventory and certification of natural forage lands. Environmental measures. Conditions of carrying out of superficial improvement. Conditions for radical improvement. Selection of types of herbs for grass mixtures, taking into account environmental conditions and the nature of use, their sowing. Care of grass crops. Cover and non-cover crops of grasses. Value of pastures and pasture feed. Basic requirements for pastures. Pasture use systems and grazing methods. Creation of cultural pastures, their equipment and use. Green conveyor and its types. Technologies of preparation of loose, crushed and pressed hay. The technology of making haylage. The technology of preparation of silage. Preparation of herbal flour, pellets and briquettes. Quality of herbal flour and its storage.	
Basic information about the discipline:	
1. Name of the discipline	Technology of storage and processing of crop products
2. Number of credits	5
3. Prerequisites:	Biology, Microbiology, plant Systematics, crop Protection, crop Production, Agriculture, Agrometeorology.
4. Post requisites:	Bachelor's degree projects (works)
5. Competences:	Know: the main tasks in the field of storage and processing of crop products; requirements for the quality of crop products; ways to improve the quality of crop products during storage and processing; methods for assessing the quality of crop products; modes and methods of storage of crop products used in agriculture; the basics of processing crop products. be able to: draw up a plan for mixing crop production in storage facilities taking into account quality; work with processing and processing machines of agricultural type; analyze samples of agricultural products according to state standards; determine the quality of crop production; keep quantitative records of crop production during storage;sell crop products taking into account quality indicators.
6. Course author	The Department of agriculture and plant growing (Gordeeva Elena, Kipshakbaeva Asemgul Amangeldinovna)
7. Primary literature	Мусынов К.М., Гордеева Е.А. Технология хранения и переработки растениеводческой продукции. Астана,КАТУ,2012. Трисвятский Л.А. и др. Хранения и технология сельскохозяйственных продуктов/ Под ред. Л.А. Трисвятского. - 4-е изд. перраб и доп. -М.: Агропроиздат. 1991.415с. Технология переработки продукции растениеводства/Под ред. Н. М. Личко.-М.: КолосС, 2008.-616 с. Мусынов К.М., Гордеева Е.А. Хранения и переработка зерна, плодов и овощей. Астана,КАТУ,2011.
8. Content of the discipline. Requirements for the quality of crop production. General principles for storing agricultural products. Theory and practice of storage of seed grain and food and feed stocks. Processing of grain and oilseeds. Storage of potatoes, vegetables and fruits. Processing of potatoes, vegetables and fruits. Storage and processing of sugar beet. Basics of compound feed production. Basics of storage and primary processing of plant fibers.	